VOLUME 11 PART 1

NORTH AMERICAN FLORA

OEDOGONIALES

OEDOGONIACEAE

LEWIS HANFORD TIFFANY

BIBLIOGRAPHY

JOHN HENDLEY BARNHART

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ANNOUNCEMENT

NORTH AMERICAN FLORA is designed to present in one work descriptions of all plants growing, independent of cultivation, in North America, here taken to include Greenland, Central America, the Republic of Panama, and the West Indies, except Trinidad, Tobago, and Curaçao and other islands off the north coast of Venezuela, whose flora is essentially South American.

The work will be published in parts at irregular intervals, by the New York Botanical Garden, through the aid of the income of the David Lydig Fund bequeathed by Charles P. Daly.

It is planned to issue parts as rapidly as they can be prepared, the extent of the work making it possible to commence publication at any number of points. The completed work will form a series of volumes with the following sequence:

Volume 1. Myxomycetes, Schizophyta.
Volumes 2 to 10 Fungi.
Volumes 11 to 13. Algae.
Volumes 14 and 15. Bryophyta.
Volume 16. Pteridophyta and Gymnospermae.
Volumes 17 to 19. Monocotyledones.
Volumes 20 to 34. Dicotyledones.

The preparation of the work has been referred to a committee consisting of Dr. H. A. Gleason, Dr. J. H. Barnhart, and Dr. Fred J. Seaver.

Professor William Trelease, of the University of Illinois, and Dr. William R. Maxon, of the United States National Herbarium, have consented to act as an advisory committee.

Each author will be wholly responsible for his own contributions, being restricted only by the general style adopted for the work, which must vary somewhat in the treatment of diverse groups.

NORTH AMERICAN FLORA is published in parts of variable size; it is expected that four or more parts will be required for each volume. The subscription price for all parts published prior to 1936 is fixed at $1.50 for each part; for later parts it is approximately two cents per page. A limited number of separate parts will be sold at an advance of a third above the subscription price.

THE NEW YORK BOTANICAL GARDEN
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Order **OEDOGONIALES**

By Lewis Hanford Tiffany

Plants aquatic or terrestrial; filaments simple or branching; cells uninucleate; chloroplast parietal, generally in the form of a reticulum, with one or more pyrenoids; cell division by the rupture of the wall due to stretching of a ring-like thickening on the inner wall of each cell near the apex, and the formation of new transverse septa between the daughter nuclei; reproduction asexually by multiciliate zoospores formed singly in vegetative cells and germinating almost immediately; reproduction sexually by eggs and sperms in oogonia and antheridia; oogonia single or in series, arising as a result of division of a vegetative cell, opening by a pore or lid, through which the sperm may pass; egg when fertilized becoming an oospore, with a wall of two to four layers, which after a period of rest produces four zoospores (occasionally only one zoospore), two of which in dioecious species are perhaps male and two female, potentially; antheridia either in the same filament as the oogonia or in separate filaments; male filaments approximately the same size as the female, or much smaller; dwarf males, arising from the germination of androspores, epiphytic on or near the oogonium or more rarely scattered; sperms 1 or 2 in each antheridium.

Note: It is quite certain that intensive and careful collecting in the future will show most species of the Oedogoniales to be world-wide in distribution. Many of them will undoubtedly be recorded for North America. The names of all extra-limital species appear in the keys without numbers and are not discussed in the text.

One family.

Family 1. Oedogoniaceae.

Family 1. OEDOGONIACEAE

By Lewis Hanford Tiffany

Characters the same as those of the order.

Filaments branched.
- Vegetative cells with laterally placed setae. — 1. Bulbochaete.
- Vegetative cells devoid of setae. — 2. Oedocladium.

Filaments unbranched. — 3. Oedogonium.

1. BULBOCHAETE Ag. Syn. Alg. xxix. 1817.

Filaments usually attached, with unilateral branches; vegetative cells normally widening upwards; basal cell ordinarily the only one capable of division in formation of the main axis, the first new cell forming a long tubular bristle with swollen bulb-like base, the subsequent cells intercalated between the basal cell and the one next above; division rarely intercalary; other vegetative cells potential origin for branches; terminal cell of each branch always furnished with a bristle; oogonium arising by a double division of a vegetative cell; other characters as in the family.

Type species, *Conferva setigera* Roth.

Antheridium and oogonium in same filament: monoecious.
- Oogonium 30–40 μ in length.
  - Vegetative cell longer than broad. — 1. *B. nana.*
  - Vegetative cell shorter than broad. — 2. *B. monile.*
- Oogonium 40–60 μ in length.
  - Pore of oogonium more than 5 μ wide. — *B. megastoma.*
  - Pore of oogonium less than 5 μ wide.
    - Vegetative cell 1–1$\frac{1}{4}$ diameters long.
      - Oogonium 28–34 μ in diameter. — 3. *B. robusta.*
      - Oogonium 24–28 μ in diameter. — 4. *B. basispora.*
    - Vegetative cell 1$\frac{1}{4}$–2 diameters long.
      - Oogonium regularly ellipsoid. — 5. *B. Debaryana.*
      - Oogonium cylindric- to oblong-ellipsoid.
        - Length of oogonium 40–48 μ. — *B. mirabilis* f. *immersa.*
        - Length of oogonium 47–58 μ.
          - Vegetative cell 13–16 μ in diameter. — 6*a*. *B. mirabilis* var. *gracilis.*
          - Vegetative cell 15–20 μ in diameter. — 6. *B. mirabilis.*

Antheridium in separate filament ("dwarf male") from oogonium: dioecious-nannandrous.
- Oospore-wall smooth.
  - Length of oogonium 24–39 μ.
    - Suffultory cell without division.
      - Oogonium 23–25 by 26–33 μ. — *B. doliiformis.*
      - Oogonium 29–35 by 24–27 μ. — 9. *B. minuta.*
    - Suffultory cell with division.
      - Division of suffultory cell basal.
        - Oogonium 29–35 by 24–27 μ. — 9. *B. minuta.*
        - Oogonium 34–44 by 31–38 μ. — 7. *B. elatior.*
        - Oogonium 31–37 by 28–37 μ. — *B. elatior* f. *pumila.*
      - Division of suffultory cell median or nearly so.
        - Oogonium 36–42 by 33–39 μ. — 15. *B. angulosa.*
        - Oogonium 33–38 by 31–37 μ. — *B. angulosa* f. *picta.*
  - Length of oogonium 40–52 μ.
    - Division of suffultory cell basal. — *B. diamesandria.*
    - Division of suffultory cell median or nearly so.
      - Oogonium about 46 by 44 μ. — *B. elachistandria.*
      - Oogonium 55–64 by 43–51 μ. — 20. *B. obliqua.*
    - Division of suffultory cell superior. — *B. glabra.*
  - Length of oogonium 75–80 μ. — *B. anomala.*
- Oospore-wall scrobiculate.
  - Oogonium 27–40 μ in length.
    - Division of suffultory cell basal.
      - Vegetative cell 13–17 μ in diameter.
        - Dwarf male stipe 8–9 μ in diameter. — *B. Woronichini.*
        - Dwarf male stipe 11–13 μ in diameter. — 8. *B. scrobiculata.*
      - Vegetative cell 17–20 μ in diameter. — 10. *B. Brebissonii.*

Division of suffultory cell inferior.
Oogonium 36–43 by 27–34 μ. 11. *B. Furberae.*
Oogonium 46–50 by 35–37 μ. 12. *B. depressa.*
Division of suffultory cell median or nearly so.
Vegetative cell 10–15 μ in diameter. 11. *B. Furberae.*
Vegetative cell 17–20 μ in diameter. 14. *B. intermedia.*
Division of suffultory cell superior.
Oospore 27–34 μ in length 16. *B. Nordstedtii.*
Oospore 33–38 μ in length. *B. borealis.*
Oogonium 40–65 μ in length.
Diameter of oogonium 40–60 μ.
Division of suffultory cell basal. 10. *B. Brebissonii.*
Division of suffultory cell median or nearly so.
Idioandrosporous. 29. *B. congener.*
Gynandrosporous.
Diameter of oogonium 40–51 μ.
Vegetative cell 1–2 diameters long. 28. *B. quadrata.*
Vegetative cell 2–5 diameters long. *B. subintermedia.*
Diameter of oogonium 52–60 μ. 26. *B. crassa.*
Division of suffultory cell superior.
Oogonium subquadrangular-globose. 21. *B. sessilis.*
Oogonium subdepressed-globose. 24. *B. dispar.*
Division of suffultory cell supreme. *B. dispar* var. *Ripartiana.*
Diameter of oogonium 60–80 μ.
Idioandrosporous. 25. *B. crassiuscula.*
Gynandrosporous.
Diameter of oogonium 59–70 μ.
Length of oogonium 48–56 μ. 27. *B. valida.*
Length of oogonium 57–60 μ. *B. punctulata.*
Diameter of oogonium 70–80 μ. 22. *B. setigera.*
Oogonium 65–88 μ in length.
Oogonium globose. 23. *B. alabamensis.*
Oogonium pyriform. *B. pyrulum.*
Oospore-wall crenulate. 13. *B. crenulata.*
Oospore-wall variable: smooth to scrobiculate.
Division of suffultory cell median or nearly so.
Idioandrosporous. 18. *B. polyandria.*
Gynandrosporous.
Oogonium 36–42 μ in diameter. 16. *B. Nordstedtii.*
Oogonium 42–46 μ in diameter. 14*a*. *B. intermedia* var. *depressa.*
Division of suffultory cell superior.
Diameter of vegetative cell 10–12 μ. *B. Nordstedtii* var. *minor.*
Diameter of vegetative cell 14–22 μ.
Vegetative cell usually less than 2 diameters long. *B. borealis.*
Vegetative cell usually more than 2 diameters long.
Gynandrosporous.
Diameter of oogonium 36–43 μ. 16. *B. Nordstedtii.*
Diameter of oogonium 28–32 μ. 17. *B. suberecta.*
Idioandrosporous. 18. *B. polyandria.*
Oospore-wall variable: scrobiculate to crenulate. 13. *B. crenulata.*
Oospore-wall reticulate-scrobiculate.
Oogonium 54–58 by 41–54 μ. 43. *B. praereticulata.*
Oogonium 60–70 by 50–58 μ. 19. *B. gigantea.*
Oospore-wall angularly pitted. 41. *B. alpina.*
Oospore-wall areolate. 42. *B. areolata.*
Oospore-wall costate.
Oogonium 29–40 μ in length.
Suffultory cell without division. 30. *B. pygmaea.*
Suffultory cell with division supreme. 31. *B. cimarronea.*
Oogonium 40–65 (68) μ in length.
Diameter of oogonium 22–27 μ. 32. *B. tenuis.*
Diameter of oogonium 27–42 μ.
Vegetative cell repand. 33. *B. repanda.*
Vegetative cell cylindric or nearly so.
Diameter of oogonium 32–39 μ. 34. *B. rectangularis.*
Diameter of oogonium 28–32 μ. 35. *B. hiloensis.*
Vegetative cell neither cylindric nor repand.
Oogonium 40–56 μ in length.
Vegetative cell 17–22 μ in diameter. 36. *B. varians.*
Vegetative cell 13–18 μ in diameter.
Dwarf male stipe 17–18 by 28–31 μ. 36*a*. *B. varians* var. *hawaiensis.*
Dwarf male stipe 11–14 by 15–24 μ.
Oogonium 40–46 μ long. 36*b*. *B. varians* var. *subsimplex.*
Oogonium 47–53 μ long. *B. norvegica.*
Oogonium 57–80 μ in length.
Oogonium fusiformly ellipsoid.
Costae of oospore smooth. *B. rhadinospora.*
Costae of oospore crenulate. *B. rhadinospora* f. *antiqua.*
Oogonium broadly ellipsoid to ovoid.

Costae of oospore coarsely serrate or crenulate. *B. lagoensis.*
Costae of oospore finely serrate or smooth.
Vegetative cell 18–25 by 27–50 μ. 37. *B. minor.*
Vegetative cell 15–22 by 22–60 μ. *B. minor* var. *germanica.*
Oogonium 65–95 μ in length.
Diameter of oogonium 29–37 μ.
Costae of oospore smooth. *B. rhadinospora.*
Costae of oospore crenulate. *B. rhadinospora* f. *antiqua.*
Diameter of oogonium 38–46 μ.
Oogonium 67–78 μ in length. *B. affinis.*
Oogonium 75–87 μ in length. *B. litoralis.*
Diameter of oogonium 46–56 μ.
Vegetative cell 19–25 by 40–100 μ.
Ribs of oospore broadly denticulate. 39. *B. insignis.*
Ribs of oospore reticulate-denticulate. 40. *B. reticulata.*
Vegetative cell 26–27 by 52–54 μ. *B. anomala.*
Vegetative cell 27–30 by 34–45 μ. *B. denticulata.*
Diameter of oogonium 56–66 μ. 38. *B. Bullardi.*
Diameter of oogonium 68–70 μ. *B. regalis.*
Oogonium 104–108 μ in length. *B. imperialis.*
Reproductive structure uncertain or unknown.
Vegetative cell blood-red in color. *B. sanguinea.*
Vegetative cell not blood-red in color.
Vegetative cell medianly plicate. *B. horrida.*
Vegetative cell spinose. 44. *B. spinosa.*
Vegetative cell neither plicate nor spinose.
Oogonium 20–24 μ in diameter. *B. spirogranulata.*
Oogonium 34–42 μ in diameter. *B. brevifulta.*

1. **Bulbochaete nana** Wittr. Bih. Sv. Vet.-Akad. Handl. **1**[1]: 7. 1872.

Bulbochaete nana var. *subbasispora* Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 50. 1874.

Monoecious; oogonium ellipsoid, patent, below terminal seta or vegetative cell; outer wall of oospore longitudinally costate; antheridia 1 or 2, erect (rarely patent), subepigynous or scattered; vegetative cell 10–17 by 10–27 μ; oogonium 20–25 (30) by 33–40 μ; oospore 18–23 (28) by 30–38 μ; antheridium 7–9 by 5–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Illinois, Oklahoma; Alaska; Greenland.
PLATE 1. *f. 7.*

2. **Bulbochaete monile** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 50. 1874.

? *Bulbochaete nana* Wolle, Fresh-w. Algae U. S. 100. 1887. Not *B. nana* Wittr. 1872.

Monoecious, usually few-celled; vegetative cell short and sometimes globose; oogonium ellipsoid, patent (rarely erect), below terminal seta or vegetative cell; outer wall of oospore longitudinally costate; antheridia 1 or 2, erect or patent, subepigynous or scattered; vegetative cell 11–16 by 10–16 μ; oogonium 22–25 by 30–38 μ; oospore 20–23 by 28–35 μ; antheridium 8–10 by 6–8 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts; New Jersey; British Columbia.
PLATE 1. *f. 1.*

3. **Bulbochaete robusta** (Hirn) Tiff. Ohio Jour. Sci. **34**: 323. 1934.

Bulbochaete monile var. *robusta* Hirn, Acta Soc. Sci. Fenn. **27**: 349. 1900.

Monoecious; vegetative cell often nearly globose; oogonium broadly ellipsoid, usually patent, below terminal seta or vegetative cell; outer wall of oospore longitudinally costate; antheridia 1 or 2, erect or patent, subepigynous or scattered; vegetative cell 14–23 by 14–27 μ; oogonium 28–34 by 39–45 μ; oospore 26–32 by 37–42 μ; antheridium 8–10 by 5–8 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Ohio, Indiana.
PLATE 1. *f. 2.*

4. **Bulbochaete basispora** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 50. 1874.

Monoecious; oogonium ellipsoid or subcylindric-ellipsoid, patent or erect, below vegetative cell; outer oospore-wall longitudinally costate; antheridia 1–3, patent or erect, scattered or subepigynous; vegetative cell 15–19 by 15–23 μ; oogonium 24–28 by 40–45 μ; oospore 22–25 by 38–43 μ; antheridium 8–11 by 6–8 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio.
PLATE 1. *f. 6*.

5. **Bulbochaete Debaryana** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 51. 1874.

Monoecious; oogonium ellipsoid, patent, below vegetative cell or terminal seta; outer wall of oospore longitudinally costate; antheridia 1–?, patent or seldom erect, subepigynous or scattered; vegetative cell 18–22 by 23–44 μ; oogonium 27–33 by 43–50 μ; oospore 25–30 by 40–48 μ; antheridium 10–12 by 8–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Canada.
PLATE 1. *f. 3*.

6. **Bulbochaete mirabilis** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 137. 1870.

Bulbochaete mirabilis var. *lapponica* Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 51. 1874.

Monoecious; oogonium cylindric-ellipsoid to suboblong-ellipsoid, patent (rarely erect), below terminal seta or vegetative cell; outer wall of oospore longitudinally costate; antheridia 1–4, erect or patent, subepigynous or scattered; vegetative cell 15–20 by 20–40 μ; oogonium 26–33 by 46–58 μ; oospore 25–31 by 44–56 μ; antheridium 9–12 by 6–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, New Jersey, Michigan, Illinois, Wisconsin, Minnesota; Greenland.
PLATE 1. *f. 4*.

6*a*. **Bulbochaete mirabilis** var. **gracilis** (Pringsh.) Hirn, Acta Soc. Sci. Fenn. **27**: 353. 1900. *Bulbochaete gracilis* Pringsh. Jahrb. Wiss. Bot. **1**: 74. 1857. Vegetative cell 13–16 by 17–32 μ; oogonium 20–28 by 47–55 μ; oospore 18–26 by 45–53 μ; antheridium 8–11 by 6–8 μ. TYPE LOCALITY: Germany. DISTRIBUTION: Ohio. PLATE 1. *f. 5*.

7. **Bulbochaete elatior** Pringsh. Jahrb. Wiss. Bot. **1**: 73. 1857.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose to depressed-subquadrangular-globose, erect or seldom patent, below androsporangium; division of suffultory cell basal; oospore smooth; androsporangia epigynous or rarely scattered, 1 or 2; dwarf male usually on suffultory cell, antheridium exterior, unicellular, stipe scarcely longer than the antheridium; vegetative cell 13–18 by 20–63 μ; oogonium 34–44 by 31–38 μ; oospore 32–42 by 29–36 μ; androsporangium 10–13 by 8–11 μ; dwarf male stipe 8–10 by 18–35 μ; antheridium 6–8 by 9–11 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts.
PLATE 1. *f. 11*.

8. **Bulbochaete scrobiculata** (Tiff.) Tiff. Ohio Jour. Sci. **34**: 323. 1934.

Bulbochaete elatior var. *scrobiculata* Tiff. Trans. Am. Micr. Soc. **47**: 135. 1928.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose to nearly globose, usually erect, below androsporangium or vegetative cell; division of suffultory cell basal; oospore-wall minutely scrobiculate; androsporangia epigynous or scattered, 1 or 2; dwarf male

on oogonium; antheridia 1 or 2, exterior; vegetative cell 13–16 by 28–40 μ; oogonium 28–44 by 28–36 μ; oospore 26–42 by 26–34 μ; androsporangium 10–13 by 10–16 μ; antheridium 6–8 by 4–7 μ; dwarf male stipe 11–13 by 16–20 μ.

TYPE LOCALITY: Mobile, Alabama.
DISTRIBUTION: Alabama.
PLATE 1. *f. 8.*

9. **Bulbochaete minuta** W. & G. West, Trans. Linn. Soc. II. **6**: 126. 1902.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose, patent or erect, below the androsporangium, division of oogonium median or nearly so; suffultory cell without division, or with division basal; oospore-wall smooth; androsporangium unicellular, epigynous; dwarf male on suffultory cell; antheridium exterior, unicellular; stipe twice as long as antheridium, curved; vegetative cell 9–12 by 18–35 μ; oogonium 29–35 by 24–27 μ; oospore 27–33 by 22–25 μ; androsporangium 9–11 by 6–9 μ; dwarf male 6–7 by 18–20 μ.

TYPE LOCALITY: Ceylon.
DISTRIBUTION: Massachusetts, Florida, Oklahoma.
PLATE 2. *f. 13.*

10. **Bulbochaete Brebissonii** Kütz. Tab. Phyc. **4**: 19. 1854.

Bulbochaete tumida Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 139. 1870.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-subquadrangular-globose, erect, below terminal seta or androsporangium; division of the suffultory cell basal; outer oospore-wall scrobiculate; androsporangia scattered or epigynous, 1–3; dwarf male on oogonium (rarely on adjacent cells); antheridium interior; stipe slightly curved, shorter than antheridium; vegetative cell 17–20 by 50–90 μ; oogonium 42–50 by 37–45 μ; oospore 40–48 by 35–43 μ; androsporangium 11–15 by 12–18 μ; dwarf male 10–12 by 28–33 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Michigan, Illinois; Alaska; British Columbia.
PLATE 1. *f. 9.*

11. **Bulbochaete Furberae** Collins, Rhodora **20**: 142. 1918.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose, below terminal seta, patent (rarely erect); division of suffultory cell inferior; outer wall of oospore scrobiculate; androsporangia 1–9, scattered; dwarf male on oogonium, stipe strongly curved; antheridium interior; vegetative cell 10–15 by 30–75 μ; oogonium 36–43 by 27–34 μ; oospore 34–41 by 25–32 μ; androsporangium 9–10 by 8–9 μ; dwarf male 7–8 by 20–25 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts, North Carolina, Wyoming.
PLATE 2. *f. 12.*

12. **Bulbochaete depressa** (Taft) Taft, sp. nov.

Bulbochaete Furberae var. *depressa* Taft, Bull. Torrey Club **62**: 283. 1935.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose, terminal or rarely below suffultory cell, patent or rarely erect; division of suffultory cell inferior; outer wall of oospore scrobiculate; androsporangia 1–3, epigynous; dwarf male curved, on or near oogonium; antheridium interior; vegetative cell 13–17 by 33–83 μ; oogonium 46–50 by 35–37 μ; oospore 44–48 by 32–35 μ; androsporangium 11–14 by 6–10 μ; dwarf male 10–12 by 26–30 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 2. *f. 23.*

13. **Bulbochaete crenulata** Pringsh. Jahrb. Wiss. Bot. **1**: 72. 1857.

Bulbochaete crenulata var. *plena* Wittr. Bih. Sv. Vet.-Akad. Handl. 1^1: 19. 1872.

Dioecious, nannandrous, gynandrosporous; oogonium subdepressed-globose, patent, below terminal seta or androsporangium, or rarely vegetative cell; division of suffultory cell median

or slightly below; spore-wall scrobiculate to crenulate; androsporangia epigynous or scattered, 1–5; dwarf male on or near oogonium; antheridium interior; stipe slightly curved, shorter than antheridium; vegetative cell 16–20 by 32–70 μ; oogonium 43–48 by 35–43 μ; oospore 40–46 by 33–40 μ; antheridium 10–15 by 7–10 μ; dwarf male 9–10 by 24–26 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Ohio, Michigan, Illinois, Florida, Oklahoma.
PLATE 2. *f. 17*.

14. **Bulbochaete intermedia** De Bary, Abh. Senck. Nat. Ges. 1: 72. 1854.

Bulbochaete crenulata var. *supramediana* Wittr.; Wittr. & Nordst. Algae Exsicc. *509*. 1883; Bot. Notiser **1883**: 148. 1883.
Bulbochaete intermedia f. *americana* Hirn. Acta Soc. Sci. Fenn. **27**: 328. 1900.
Bulbochaete intermedia f. *supramediana* Hirn, Acta Soc. Sci. Fenn. **27**: 328. 1900.

Dioecious, nannandrous, gynandrosporous; oogonium subdepressed-globose, patent, below androsporangium; division of suffultory cell nearly median; outer wall of oospore scrobiculate; androsporangia 1 or 2, epigynous or rarely scattered; dwarf male on oogonium; antheridium interior; stipe slightly curved, shorter than the antheridium; vegetative cell 17–20 by 35–70 μ; oogonium 40–48 by 31–40 μ; oospore 38–46 by 30–38 μ; androsporangial cell 11–13 by 7–12 μ; dwarf male 9–10 by 21–26 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Connecticut, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Florida, Oklahoma; Alaska; British Columbia; Greenland.
PLATE 2. *f. 14*.

14*a*. **Bulbochaete intermedia** var. **depressa** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 44. 1874. *Bulbochaete intermedia* var. *depressa* Hirn; Heering, in Pascher, Süssw.-fl. Deutschl. **6**: 233. 1914. Vegetative cell a little longer than in the species; oogonium depressed-globose; outer oospore-wall scrobiculate, often nearly smooth; division of the suffultory cell a little above the median position (rarely a little below median); vegetative cell 14–19 by 35–88 μ; oogonium 42–46 by 30–40 μ; oospore 40–44 by 28–38 μ; androsporangial cell 11–13 by 9–12 μ; dwarf male 9–11 by 22–25 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Iowa; British Columbia. PLATE 2. *f. 15*.

15. **Bulbochaete angulosa** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 45. 1874.

? *Bulbochaete elachistandria* Wolle, Fresh-w. Algae U. S. 97. 1887. Not *B. elachistandria* Wittr. 1874.

Dioecious, nannandrous, gynandrosporous; oogonium biconically and angularly globose, apically truncate, below terminal seta or rarely androsporangium; division of suffultory cell a little above median position; oospore-wall smooth; androsporangia scattered or epigynous, 1–3; dwarf male on oogonium; antheridium interior; stipe somewhat curved; vegetative cell 13–18 by 20–45 μ; oogonium 36–42 by 33–39 μ; oospore 34–40 by 30–36 μ; androsporangium 10–11 by 9–10 μ; dwarf male 8–9 by 18–21 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Pennsylvania.
PLATE 1. *f. 10*.

16. **Bulbochaete Nordstedtii** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 44. 1874.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose or subquadrangularly so, patent, below androsporangium or rarely terminal seta; division of suffultory cell superior (occasionally submedian); oospore-wall finely scrobiculate or nearly smooth; androsporangium unicellular, epigynous; dwarf male on oogonium, stipe slightly curved, shorter than antheridium; vegetative cell 14–18 by 28–85 μ; oogonium 36–43 by 29–36 μ; oospore 34–41 by 27–34 μ; androsporangium 10–12 by 9–12 μ; dwarf male 9–19 by 23–25 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Connecticut, Ohio, Illinois, Oklahoma; Alaska; Greenland.
PLATE 2. *f. 20*.

17. **Bulbochaete suberecta** (Collins) Tiff. Ohio Jour. Sci. **34**: 323. 1934.

Bulbochaete Nordstedtii f. *suberecta* Collins, Tufts Coll. Stud. **3**: 88. 1912.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose, usually erect, below androsporangium; division of suffultory cell supramedian to superior; oospore-wall finely scrobiculate; androsporangium unicellular, epigynous; dwarf male on oogonium; vegetative cell 12–15 by 28–80 μ; oogonium 28–32 by 34–38 μ; oospore 26–30 by 32–36 μ; androsporangium 7–8 by 5–6 μ; dwarf male 9–16 by 10–20 μ.

TYPE LOCALITY: Arlington, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 2. *f. 16.*

18. **Bulbochaete polyandria** Cleve; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 140. 1870.

Dioecious, nannandrous, idioandrosporous; oogonium subdepressed-globose, patent, below terminal seta or vegetative cell; division of suffultory cell superior (rarely submedian); outer oospore-wall scrobiculate or nearly smooth; androsporangium to 10-seriate; dwarf male on oogonium; antheridium interior; stipe slightly curved, shorter than antheridium; vegetative cell 15–20 by 45–100 μ; oogonium 39–46 by 32–42 μ; oospore 37–44 by 30–40 μ; androsporangium 12–14 by 11–15 μ; dwarf male 8–9 by 23–26 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Florida.
PLATE 2. *f. 18, 19.*

19. **Bulbochaete gigantea** Pringsh. Jahrb. Wiss. Bot. **1**: 71. 1857.

Dioecious, nannandrous, idioandrosporous; oogonium subdepressed-globose, or rarely depressed-oboviform-globose, patent, below terminal seta, rarely below vegetative cell; division of suffultory cell slightly below median; outer wall of oospore reticulate-scrobiculate; androsporangia 1–5; dwarf male slightly longer than the oogonium on which it develops; antheridium interior; stipe about twice as long as antheridium, curved; vegetative cell 24–32 by 50–112 μ; oogonium 60–70 by 50–58 μ; oospore 58–68 by 48–56 μ; androsporangial cell 18–20 by 10–14 μ; dwarf male stipe 10–13 by 28–45 μ; antheridial cell 13–14 by 20–30 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Pennsylvania, Michigan, Iowa, Florida, Oklahoma.
PLATE 3. *f. 24, 25.*

20. **Bulbochaete obliqua** Lundell; Hirn, Acta Soc. Sci. Fenn. **27**: 344. 1900.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonium depressed-globose, patent, below terminal seta or (rarely) androsporangium; division of suffultory cell median or nearly so; oospore-wall smooth; androsporangia 1–?, epigynous; dwarf male on oogonium; antheridium interior; vegetative cell 21–27 by 42–108 μ; oogonium 55–64 by 43–51 μ; oospore 53–62 by 40–49 μ; androsporangium 16–21 by 7–10 μ; dwarf male stipe 9–10 by 25–36 μ; antheridium 10–12 by 15–21 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Michigan, Oklahoma.
PLATE 3. *f. 26.*

21. **Bulbochaete sessilis** Wittr. Bih. Sv. Vet.-Akad. Handl. **1**[1]: 18. 1872.

Dioecious, nannandrous, gynandrosporous; oogonium subquadrangularly globose, patent, below terminal seta or occasionally below vegetative cell; division of suffultory cell superior; outer oospore-wall scrobiculate; androsporangia scattered, 1–3; dwarf male on oogonium or

rarely suffultory cell; antheridium interior; stipe a little curved, shorter than antheridium; vegetative cell 19–22 by 38–72 μ; oogonium 51–56 by 44–50 μ; oospore 48–54 by 42–48 μ; androsporangium 10–13 by 10–12 μ; dwarf male 9–11 by 26–29 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Canada.
PLATE 3. *f. 27*.

22. **Bulbochaete setigera** (Roth) Ag. Syn. Alg. 71. 1817.

Conferva setigera Roth, Catalecta Bot. **3**: 283. 1806.
? *Bulbochaete Canbyii* H. C. Wood, Fresh-w. Algae N. Am. 202. 1873.
? *Bulbochaete setigera* var. *Canbyii* Wolle, Fresh-w. Algae U. S. 99. 1887.

Dioecious, nannandrous, gynandrosporous; oogonium (quadrangularly) subdepressed- or depressed-globose, patent, generally below terminal seta, more rarely below androsporangium or vegetative cell; division of suffultory cell slightly above median or rarely superior; outer oospore-wall scrobiculate; androsporangia scattered or more rarely epigynous, 1–3; dwarf male on oogonium or near it; antheridium interior; stipe curved, shorter than antheridium; vegetative cell 25–28 by 62–140 μ; oogonium 70–80 by 56–65 μ; oospore 67–77 by 53–62 μ; androsporangium 16–20 by 10–18 μ; dwarf male 11–14 by 30–36 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Connecticut, New Jersey, Michigan, South Carolina, Florida, Alabama.
PLATE 3. *f. 30*.

23. **Bulbochaete alabamensis** Transeau & Brown; Tiff. Trans. Am. Micr. Soc. **47**: 142. 1928.

Dioecious, nannandrous, gynandrosporous; oogonium globose, depressed-globose, or rarely angularly globose, patent; division of suffultory cell superior; outer spore-wall scrobiculate; androsporangium hypogynous or epigynous or rarely scattered; dwarf male a little shorter than oogonium, on vegetative cell; antheridium interior; stipe a little curved; vegetative cell 22–40 by 62–111 μ; oogonium 77–92 by 70–88 μ; oospore 75–90 by 68–86 μ; dwarf male stipe 14–18 by 35–38 μ; antheridium 14–15 by 15–16 μ.

TYPE LOCALITY: Mobile, Alabama.
DISTRIBUTION: North Carolina, Florida, Alabama.
PLATE 3. *f. 28*.

24. **Bulbochaete dispar** Wittr.; Wittr. & Nordst. Algae Exsicc. *401*. 1882; Bot. Notiser **1882**: 54. 1882.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonium subdepressed-globose, patent, below terminal seta or rarely vegetative cell; division of suffultory cell superior (rarely submedian); outer spore-wall thick, finely scrobiculate; androsporangia scattered, 1 or 2; dwarf male on oogonium; antheridium interior; stipe a little curved, shorter than antheridium; vegetative cell 16–21 by 32–95 μ; oogonium 44–56 by 42–51 μ; oospore 40–54 by 38–48 μ; androsporangium 12–16 by 10–12 μ; dwarf male 9–11 by 23–26 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan; Greenland.
PLATE 4. *f. 37*.

25. **Bulbochaete crassiuscula** Nordst. Oefv. Sv. Vet.-Akad. Förh. **34**[4]: 30. 1877.

Bulbochaete setigera Möbius, Abh. Senck. Nat. Ges. **18**: 315. 1894. Not *B. setigera* Ag. 1817.
? *Bulbochaete ellipsospora* G. West, Jour. Bot. **37**: 54. 1899.

Dioecious, nannandrous, idioandrosporous; oogonium (subquadrangularly) depressed-globose, patent, below terminal seta or occasionally vegetative cell; division of suffultory cell superior (rarely submedian); outer oospore-wall scrobiculate; androsporangia 1–4; dwarf male on oogonium or near it; antheridium interior; stipe slightly curved, shorter than antheridium;

vegetative cell 22–27 by 55–148 μ; oogonium 60–78 by 50–62 μ; oospore 58–76 by 48–60 μ; antheridium 16–19 by 10–13 μ; dwarf male 12–14 by 30–34 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Michigan, Illinois, Oklahoma; Canada; Greenland.
PLATE 4. *f. 32, 33.*

26. **Bulbochaete crassa** Pringsh. Jahrb. Wiss. Bot. 1: 72. 1857.

Dioecious, nannandrous, gynandrosporous; oogonium subdepressed-globose to globose, patent, below terminal seta or rarely vegetative cell; division of suffultory cell median or a little above; outer oospore-wall scrobiculate; androsporangia scattered, up to 4-seriate; dwarf male a little longer than oogonium; antheridium exterior, unicellular; stipe about twice as long as antheridium; vegetative cell 22–26 by 44–60 μ; oogonium 52–60 by 42–51 μ; oospore 50–58 by 40–48 μ; androsporangium 13–15 by 14–16 μ; dwarf male stipe 9–11 by 32–44 μ; antheridium 8–9 by 21–24 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Ohio.
PLATE 3. *f. 29.*

27. **Bulbochaete valida** Wittr. Bih. Sv. Vet.-Akad. Handl. 1[1]: 17. 1872.

Dioecious, nannandrous, gynandrosporous; oogonium depressed-globose, patent, below terminal seta; division of suffultory cell about median; outer oospore-wall scrobiculate; androsporangia scattered, 1–3; dwarf male on oogonium; antheridium interior; stipe a little longer than antheridium, curved; vegetative cell 23–27 by 46–95 μ; oogonium 59–70 by 48–56 μ; oospore 57–68 by 46–54 μ; androsporangium 18–20 by 10–14 μ; dwarf male stipe 9–10 by 23–29 (–40) μ; antheridium 11–12 by 20–22 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan.
PLATE 3. *f. 31.*

28. **Bulbochaete quadrata** Wittr. Bih. Sv. Vet.-Akad. Handl. 1[1]: 19. 1872.

Dioecious, nannandrous, gynandrosporous; oogonium (subquadrangularly) subdepressed-globose, patent, below androsporangium; division of suffultory cell inframedian (rarely nearly median); outer oospore-wall scrobiculate; androsporangia 1 or 2, epigynous, rarely scattered; dwarf male on oogonium; antheridium interior; stipe a little curved, shorter than antheridium; vegetative cell 19–25 by 30–50 μ; oogonium 40–50 by 40–45 μ; oospore 38–48 by 38–43 μ; androsporangium 15–17 by 11–12 μ; dwarf male 10–12 by 27–32 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio.
PLATE 4. *f. 34.*

29. **Bulbochaete congener** Hirn, Acta Soc. Sci. Fenn. 27: 346. 1900.

Dioecious, nannandrous, idioandrosporous; oogonium depressed-globose or more rarely oboviform-globose, patent, below terminal seta; division of suffultory cell inframedian; outer oospore-wall scrobiculate; androsporangia 1–4; dwarf males a little shorter than the oogonium on which they develop; antheridium interior; stipe about twice as long as the antheridial cell, curved; vegetative cell 19–24 by 40–75 μ; oogonium 44–54 by (37–) 40–48 μ; oospore 42–52 by 35–46 μ; androsporangial cell 13–15 by 8–13 μ; dwarf male 9–13 by 29–34 μ; antheridial cell 10–11 by 14–17 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Iowa, Florida.
PLATE: 2. *f. 21, 22.*

30. **Bulbochaete pygmaea** Pringsh. Jahrb. Wiss. Bot. **1**: 74. 1857.

Bulbochaete pygmaea var. *minor* Pringsh. Jahrb. Wiss. Bot. **1**: 74. 1857.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, patent, below terminal seta or vegetative cell; outer wall of oospore longitudinally costate; suffultory cell without division; androsporangia subepigynous or scattered, 1–?-celled; dwarf male near oogonium; antheridium exterior, 1–3; vegetative cell 11–15 by 8–15 μ; oogonium 22–27 by 32–40 μ; oospore 20–23 by 30–38 μ; androsporangium 7–10 by 6–9 μ; dwarf male stipe 11–12 by 15–19 μ; antheridium 7–8 by 7–8 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Florida.
PLATE 4. *f. 41.*

30*a*. **Bulbochaete pygmaea** var. **erecta** Jao, Rhodora **38**: 72. 1936. Smaller; oogonium usually erect; plant usually less than 10-celled and often unbranched; vegetative cell 13–16 by 10–16 μ; oogonium 19–22 by 29–38 μ; oospore 18–21 by 28–35 μ; androsporangium 1–2-celled, 10 by 3 μ; dwarf male stipe 11 by 16 μ; basal cell 13–16 by 19–22 μ. TYPE LOCALITY: Woods Hole, Massachusetts. DISTRIBUTION: Massachusetts. PLATE 4. *f. 42, 43.*

31. **Bulbochaete cimarronea** Taft, Bull. Torrey Club **62**: 282. 1935

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, patent, below terminal seta or rarely below vegetative cell; oospore ellipsoid, outer spore-wall longitudinally costate, ribs entire; division of suffultory cell supreme; androsporangia 1 or 2, epigynous; dwarf male located on vegetative cell, rarely on oogonium; antheridia 1 or 2, exterior; vegetative cell 14–17 by 17–23 μ; oogonium 26–29 by 36–39 μ; oospore 24–26 by 35–37 μ; androsporangium 10–11 by 5–7 μ; dwarf male stipe 13–17 by 20–23 μ; antheridium 7–8 by 5–7 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 4. *f. 40.*

32. **Bulbochaete tenuis** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **27**: 368. 1900; Tiff. Oedog. Monog. 43. 1930.

Bulbochaete rectangularis var. *tenuis* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 56. 1874.
Bulbochaete rectangularis var. *norvegica* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 56. 1874.

Dioecious, nannandrous, gynandrosporous; oogonium suboblong-ellipsoid, erect or patent, below terminal seta or androsporangium; outer oospore-wall longitudinally costate; androsporangia epigynous or more rarely scattered, 1–?; dwarf male on or near oogonium; antheridia exterior, 1–3; vegetative cell 13–16 by 20–40 μ; oogonium 22–26 by 42–48 μ; oospore 20–24 by 40–46 μ; androsporangium 10–12 by 13–19 μ; dwarf male stipe 12–14 by 18–24 μ; antheridium 7–9 by 6–7 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Michigan.
PLATE 5. *f. 54.*

33. **Bulbochaete repanda** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 55. 1874.

Bulbochaete rectangularis var. *Lundellii* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 56. 1874.
? *Bulbochaete rhadinospora* Wolle, Fresh-w. Algae U. S. 103. 1887. Not *B. rhadinospora* Wittr. 1874.

Dioecious, nannandrous, gynandrosporous; oogonium suboblong-ellipsoid, patent or erect, below androsporangium, terminal seta or vegetative cell; outer oospore-wall longitudinally costate; androsporangia epigynous or subepigynous, 1–?; dwarf male near or on oogonium; antheridia exterior, 1–3; vegetative cell frequently repand, 12–17 by 24–60 μ; oogonium 26–36 by 43–58 μ; oospore 21–33 by 40–50 μ; androsporangium 13–15 by 16–21 μ; dwarf male stipe 11–15 by 21–27 μ; antheridium 7–10 by 5–7 μ.

TYPE LOCALITY: Sweden and Greenland.
DISTRIBUTION: Maine, Massachusetts, New Jersey, Florida, Oklahoma; Greenland.
PLATE 6. *f. 57.*

34. **Bulbochaete rectangularis** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 142. 1870.

? *Bulbochaete ignota* H. C. Wood, Fresh-w. Algae N. Am. 201. 1873.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, patent or more rarely erect, below terminal seta or androsporangium or more rarely vegetative cell; outer oospore-wall longitudinally costate; androsporangia scattered or epigynous, 1–?; dwarf male near or occasionally on oogonium; antheridia exterior, 1–4; vegetative cell subrectangular in section, 16–23 by 20–46 μ; oogonium 32–39 by 45–63 μ; oospore 29–37 by 43–61 μ; androsporangium 13–16 by 10–27 μ; dwarf male stipe 14–18 by 22–27 μ; antheridium 8–10 by 5–7 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Rhode Island, Connecticut, Pennsylvania, Ohio, Michigan, Illinois, Indiana, Oklahoma.
PLATE 5. *f. 53.*

35. **Bulbochaete hiloensis** (Nordst.) Tiffany, sp. nov.

Bulbochaete rectangularis var. *hiloensis* Nordst. Minnesskr. Fys. Sällsk. Lund **7**: 22. 1878.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, patent or erect, below terminal seta or androsporangium or more rarely vegetative cell; outer wall of oospore longitudinally costate; androsporangia generally epigynous, 1–?; dwarf male near oogonium; antheridia exterior, 1–4; vegetative cell subrectangular in section, 14–20 by 24–48 μ; oogonium 28–33 by 43–51 μ; oospore 26–30 by 38–45 μ; androsporangium 12–17 by 13–16 μ; dwarf male stipe 13–17 by 22–27 μ; antheridium 8–9 by 5–7 μ.

TYPE LOCALITY: Hawaii.
DISTRIBUTION: Oklahoma, Florida; Pennsylvania (?).
PLATE 5. *f. 50.*

36. **Bulbochaete varians** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 143. 1870.

Dioecious, nannandrous, gynandrosporous; oogonium ovoid, patent or erect, below terminal seta or below androsporangial cell; outer oospore-wall longitudinally ribbed, ribs serrate; androsporangia scattered, epigynous or hypogynous, 1 or 2; dwarf male on or near the oogonium; antheridia exterior, 1–3; vegetative cell 17–22 by 22–33 μ; oogonium 30–36 by 44–54 μ; oospore 28–34 by 42–52 μ; androsporangial cell 14–17 by 14–18 μ; dwarf male stipe 14–16 by 24–27 μ; antheridial cell 8–10 by 6–7 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Indiana, Michigan, Illinois, Iowa, South Carolina, Alabama, Mississippi; Canada.
PLATE 5. *f. 47.*

36*a*. **Bulbochaete varians** var. **hawaiensis** Nordst. Minnesskr. Fys. Sällsk. Lund **7**: 21. 1878. Vegetative cell 13–18 by 17–36 μ; oogonium 27–30 by 44–54 μ; androsporangium 12–16 by 13–14 μ; dwarf male stipe 17–18 by 28–31 μ; antheridium 10–11 by 6–7 μ. TYPE LOCALITY: Hawaii. DISTRIBUTION: Ohio, Illinois. PLATE 5. *f. 49.*

36*b*. **Bulbochaete varians** var. **subsimplex** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **27**: 357. 1900. *Bulbochaete pygmaea* var. *major* Pringsh. Jahrb. Wiss. Bot. **1**: 74. 1857. *Bulbochaete subsimplex* Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 142. 1870. *Bulbochaete dumosa* H. C. Wood, Fresh-w. Algae N. Am. 202. 1873. *Bulbochaete varians* var. *alpina* Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 53. 1874. *Bulbochaete reticulata* var. *minor* Lemmerm. Forsch. Biol. Sta. Plön **3**: 25. 1895. Smaller in nearly all parts; ribs of oospore serrulate or smooth; vegetative cell 13–18 by 16–34 μ; oogonium 26–30 by 39–46 μ; oospore 24–28 by 37–44 μ; androsporangial cell 10–14 by 7–16 μ; dwarf male stipe 11–14 by 15–24 μ; antheridial cell 7–8 by 5–7 μ. TYPE LOCALITY: Europe. DISTRIBUTION: Pennsylvania, Ohio, Illinois, Iowa, Mississippi; British Columbia. PLATE 5. *f. 48.*

37. **Bulbochaete minor** A. Br.; Kütz. Sp. Alg. 422. 1849.

Dioecious, nannandrous, gynandrosporous; oogonium ovoid, erect or rarely patent, below terminal seta, androsporangial cell, or more rarely vegetative cell; outer oospore-wall longitudinally costate; androsporangia epigynous, subepigynous, or scattered, 1–?; dwarf male on or near oogonium; antheridia exterior, 1–4; vegetative cell 18–25 by 27–50 μ; oogonium 32–42

by 59–69 μ; oospore 30–40 by 57–67 μ; androsporangium 15–16 by 16–21 μ; dwarf male stipe 12–15 by 22–24 μ; antheridium 6–10 by 6–7 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: New Jersey, Indiana, Illinois, Iowa.
PLATE 5. *f. 44.*

38. **Bulbochaete Bullardi** Transeau & Tiff. Ohio Jour. Sci. **19**: 241. 1919.

Dioecious, nannandrous, idioandrosporous; oogonium ovoid-ellipsoid or ellipsoid, erect, terminated by long seta; pore evident and supramedian; oospore filling or nearly filling oogonium; costae of outer wall of oospore dentate, the teeth connected by transverse lines, longitudinal costae uniting irregularly; androsporangia 1–6; dwarf male slightly curved, on oogonium or suffultory cell or vegetative cell; antheridia exterior, 1–3; vegetative cell 20–32 by 60–165 μ; oogonium 56–66 by 70–96 μ; oospore 54–64 by 67–94 μ; androsporangium 18–21 by 15–33 μ; dwarf male stipe 18–21 by 30–33 μ; antheridium 9–14 by 6–10 μ.

TYPE LOCALITY: Winchester, Massachusetts.
DISTRIBUTION: Massachusetts, Florida.
PLATE 5. *f. 45, 46.*

39. **Bulbochaete insignis** Pringsh. Jahrb. Wiss. Bot. **1**: 73. 1857.

? *Bulbochaete Pringsheimiana* Archer, Quart. Jour. Micr. Sci. II. **6**: 122. 1866.
Bulbochaete speciosa Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 143. 1870.
? *Bulbochaete pachyderma* Reinsch. Contr. Alg. Fung. **1**: 82. 1875.
? *Bulbochaete anomala* Nordst. Sv. Vet.-Akad. Handl. II. **22**[8]: 8. 1888.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, erect or patent, below androsporangium or terminal seta or vegetative cell; oospore ellipsoid with broadly denticulate longitudinal costae on the outer oospore-wall; androsporangia epigynous or scattered, 1–?; dwarf male near or on oogonium; antheridia exterior, 1–3; vegetative cell 19–25 by 48–88 μ; oogonium 46–56 by 70–90 μ; oospore 44–54 by 68–88 μ; androsporangium 16–20 by 9–25 μ; dwarf male stipe 16–19 by 29–33 μ; antheridium 10–13 by 7–10 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, New York, New Jersey, Michigan, Illinois, Kentucky, North Carolina, Florida; Alaska.
PLATE 5. *f. 51.*

40. **Bulbochaete reticulata** Nordst. Oefv. Sv. Vet.-Akad. Förh. **34** [4]: 32. 1877.

Bulbochaete insignis var. *reticulata* Hirn, Acta Soc. Sci. Fenn. **27**: 365. 1900.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, erect, below androsporangium or terminal seta or vegetative cell; outer wall of oospore reticulate-dentate, with doubly dentate, occasionally anastomosing, longitudinal ridges, the teeth united to each other by transverse ridges; androsporangia epigynous or scattered, 1–?; dwarf male on oogonium, antheridium exterior; vegetative cell 20–25 by 40–87 μ; oogonium 44–52 by 66–85 μ; oospore 42–50 by 64–83 μ; androsporangium 16–19 by 13–23 μ; dwarf male stipe 17–20 by 30–33 μ; antheridium 11–13 by 6–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Illinois, Alabama.
PLATE 5. *f. 52.*

41. **Bulbochaete alpina** Taft, Bull. Torrey Club **62**: 281. 1935.

Dioecious, nannandrous, idioandrosporous; oogonium depressed-globose, patent, below terminal seta; oospore of the same form as the oogonium, middle spore-wall scrobiculate, pits angular, concentrically arranged; division of the suffultory cell median; androsporangia 1–3, epigynous; dwarf male on the oogonium, curved; antheridium 1, exterior; vegetative cell

20–30 by 53–106 μ; oogonium 59 by 53–56 μ; oospore 58 by 51–54 μ; androsporangium 17–20 by 13–17 μ; dwarf male stipe 10–11 by 36–46 μ; antheridium 10–11 by 15–17 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 4. *f. 35, 36.*

42. **Bulbochaete areolata** Taft, Bull. Torrey Club **62**: 282. 1935.

Dioecious, nannandrous, gynandrosporous; oogonium ellipsoid, patent to erect, below the androsporangium, terminal seta, or vegetative cell; oospore ellipsoid; outer spore-wall deeply areolate with sharp points at the angles of the areolations (in section deeply undulate); division of the suffultory cell supreme; androsporangia 1–4, epigynous; dwarf male slightly curved, on the vegetative cell, antheridia 1–3, exterior; vegetative cell 15–20 by 20–46 μ; oogonium 33–36 by 53–63 μ; oospore 31–35 by 52–59 μ; androsporangium 20–26 by 17–23 μ; dwarf male stipe 13–15 by 23–25 μ; antheridium 7–10 by 4–7 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 6. *f. 55, 56.*

43. **Bulbochaete praereticulata** Jao, Rhodora **38**: 71. 1936.

Dioecious, nannandrous, idioandrosporous; oogonium depressed-globose or rarely depressed-ovoid-globose, patent, below terminal seta; division of suffultory cell median; outer wall of oospore reticulate-scrobiculate; androsporangia 1–7; dwarf male shorter than and on oogonium or on suffultory cell; antheridium interior; stipe about twice as long as antheridium, curved; vegetative cell (except basal cell), oogonium, and androsporangium spirally punctate; vegetative cell 16–26(–29) by 48–93 μ; oogonium 54–58 by 41–54 μ; oospore 52–56 by 40–52 μ; androsporangium 16–19 by 6–10 μ; dwarf male stipe 9–10 by 30–33 μ; antheridium 9–10 by 13–16 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 4. *f. 38, 39.*

44. **Bulbochaete spinosa** Wailes, Mus. Notes Vanc. **5**: 108. 1930.

Vegetative cells, with hairs 2 μ long and uniformly distributed, 15–30 by 48–80 μ; oogonium (immature) also spinose, 26 by 39 μ.

TYPE LOCALITY: Munday Lake, British Columbia.
DISTRIBUTION: Washington; British Columbia.
PLATE 36. *f. 554.*

2. **OEDOCLADIUM** Stahl, Jahrb. Wiss. Bot. **23**: 340. 1891.

Terrestrial or aquatic, branching, rhizoidal; if terrestrial, partly subterranean and subhyaline, partly above ground and green; vegetative cell cylindric or nearly so; growth chiefly by division of terminal cell of a filament or branch; asexual reproduction by "akinete" and zoospore; oogonium arising by simple division of a vegetative cell; sexual reproduction both monoecious and dioecious, nannandrous.

Types species, *Oedocladium Protonema* Stahl.

Oogonium operculate. 1. *O. operculatum.*
Oogonium poriferous.
  Monoecious, terrestrial.
    Oospore smooth. 2. *O. medium.*
    Oospore angulate.
      Pore median.
        Vegetative cell 7 by 20 μ. *O. Protonema.*
        Vegetative cell 12–18 by 56–88 μ. 2. *O. medium.*
      Pore inferior.
        Oogonium 50–60 by 50–63 μ. 3. *O. Wettsteinii.*
        Oogonium 90 by 95 μ. 4. *O. albemarlense.*
  Dioecious-nannandrous, aquatic. 5. *O. Hazenii.*

1. **Oedocladium operculatum** Tiff. Brittonia **2**: 165. 1936.

Monoecious; oogonium single (rarely in twos), often terminal, ellipsoid or oviform-ellipsoid, with supreme operculum small and often deciduous; oospore broadly ellipsoid, filling oogonium; spore-wall of three layers, the outer spore-wall smooth, the middle scrobiculate, the inner wall smooth; antheridium single or in groups of 2–4, hypogynous or subhypogynous or scattered, sperm single; terminal cell obtuse and capped; vegetative cell 8–13 by 48–175 μ; oogonium 18–34 by 32–50 μ; oospore 16–32 by 30–40 μ; antheridium 8–12 by 8–15 μ.

TYPE LOCALITY: Puerto Rico.
DISTRIBUTION: Puerto Rico.
PLATE 6. *f. 58, 59.*

2. **Oedocladium medium** I. F. Lewis; Tiff. Oedog. Monog. 52. 1930.

Monoecious; oogonium single, mostly terminal, globose to subglobose, with conic apex (if terminal); pore median; oospore globose, not quite filling oogonium; spore-wall with middle layer angulate or smooth; antheridia 1 or 2; terminal cell with conic apex; vegetative cell 12–18 by 56–78 μ; rhizoidal cell 10 by (up to) 270 μ; oogonium 52 by 52 μ; oospore 44 by 44 μ; antheridium 15 by 9–15 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 6. *f. 63–65.*

3. **Oedocladium Wettsteinii** E. Knapp, Ber. Deuts. Bot. Ges. **51**: 40. 1933.

Monoecious; oogonium single, generally terminal, globose, apically conic; pore inferior; oospore globose, filling oogonium; outer spore-wall smooth, the middle angulate (in optical section undulate), the wall smooth; antheridium to 15-celled; terminal cell apically conic; vegetative cell subcylindric, the superterraneous 30 by 30–100 μ, the subterraneous 4–8 by (up to) 300 μ; oogonium 50–60 by 50–63 μ; oospore 50–56 by 50–56 μ; antheridium 15–20 by 8–20 μ.

TYPE LOCALITY: Sanford, Florida.
DISTRIBUTION: Florida.
PLATE 6. *f. 60–62.*

4. **Oedocladium albemarlense** I. F. Lewis; Collins, Tufts Coll. Stud. **4**[7]: 71. 1918.

Monoecious; oogonium single, mostly terminal, subglobose with conic apex (if terminal); pore inferior; oospore globose, not filling oogonium; spore-wall of three layers, the outer smooth, the middle angulate (in optical section undulate), the inner smooth; antheridium to 9-seriate; vegetative cell subcylindric; terminal cell with conic apex; vegetative cell 25–40 by 50–150 μ; rhizoidal cell 4–10 by (up to) 350 μ; oogonium 90 by 95 μ; oospore 69 by 69 μ; antheridium 20–25 by 8–19 μ; zoospore 32–50 μ.

TYPE LOCALITY: Near Charlottesville, Virginia.
DISTRIBUTION: Virginia.
PLATE 6. *f. 66–69.*

5. **Oedocladium Hazenii** I. F. Lewis; Tiff. Oedog. Monog. 52. 1930.

Dioecious, nannandrous, gynandrosporous; oogonium globose to subglobose, terminal or intercalary; pore inferior; oospore globose, not or nearly filling oogonium; spore-wall with middle layer angulate; androsporangia 1 or 2, epigynous, subepigynous, or scattered; dwarf male curved or erect, on suffultory cell or more rarely on oogonium; antheridium exterior, single;

vegetative cell 15–26 by 47–132 μ; rhizoidal cell 4 by (up to) 425 μ; oogonium 50–75 by 50–75 μ; oospore 45–55 by 45–55 μ; androsporangium 16 by 7–12 μ; dwarf male stipe 18–22 by 7–10 μ; antheridium 6–8 by 6–7 μ.

TYPE LOCALITY: New Jersey.
DISTRIBUTION: New Jersey.
PLATE 7. *f. 70–78.*

3. OEDOGONIUM Link, Horae Phys. Berol. 5. 1820.

Prolifera Vaucher, Hist. Conf. 118, 129. 1803.
Vesiculifera Hassall, Hist. Brit. Freshw. Algae 195. 1845.
Cymatonema Kütz. Sp. Alg. 375. 1849.
Pringsheimia H. C. Wood, Fresh-w. Algae N. Am. 195. 1873.
Androgynia H. C. Wood, Fresh-w. Algae N. Am. 196. 1873.

Filaments single, unbranched; vegetative cells cylindric or sometimes capitellate, nodulose, or undulate; basal cell with holdfast; terminal cell obtuse, apiculate, or hyaline; all vegetative cells except the basal one capable of division; oogonia and antheridia produced by direct division of vegetative cells; other characters as in the family.

Type species, *Oedogonium grande* Kütz.

NOTE: In the text which follows, the terms oogonium, antheridium, and androsporangium, or their plurals, followed by one or more numbers, indicate groups of oogonia, antheridia, and androsporangia respectively.

Vegetative cell cylindric or nearly so.	
Vegetative cell granulate or punctate.	I.
Vegetative cell neither granulate nor punctate.	
Without dwarf males.	
Oogonium opening by a pore.	
Pore median.	II.
Pore supramedian (rarely varying to superior).	III.
Pore superior.	IV.
Pore supreme.	V.
Oogonium opening by a lid.	VI.
With dwarf males.	VII.
Vegetative cell subhexagonal or ellipsoid.	VIII.
Vegetative cell undulate or nodulose.	IX.
Vegetative cell distinctly capitellate.	X.

I

Vegetative cell densely and minutely granulate.	*O. elegans.*
Vegetative cell spirally punctate.	
Monoecious.	1. *O. curtum.*
Dioecious, macrandrous.	2. *O. punctatostriatum.*

II

Wall of oospore smooth.	
Monoecious.	
Diameter of oogonium 18–29 μ.	
Filament irregularly curved.	3. *O. curvum.*
Filament straight.	
Oogonium 18–24 by 18–26 μ.	4. *O. vulgare.*
Oogonium 24–29 by 26–31 μ.	5. *O. cryptoporum.*
Diameter of oogonium 32–38 μ.	6. *O. laeve.*
Dioecious.	
Diameter of oogonium 22–27 μ.	7. *O. rufescens.*
Diameter of oogonium 27–32 μ.	
Oogonium depressed-globose.	*O. calcareum.*
Oogonium globose.	*O. calcareum* var. *africanum.*
Diameter of oogonium 30–39 μ.	
Oospore 28–35 by 28–35 μ.	8. *O. sociale.* *O. inerme.*
Oospore 33–38 by 28–32 μ.	
Wall of oospore scrobiculate.	
Dioecious.	9. *O. Magnusii.*
Monoecious.	
Oogonium 20–24 μ in diameter.	*O. cymatosporum* var. *chungkingense.*
Oogonium 24–27 μ in diameter.	9. *O. Magnusii.*
Oogonium 30–40 μ in diameter.	10. *O. cymatosporum.*
Wall of oospore echinate.	
Diameter of vegetative cell 9–14 μ.	11. *O. suecicum.*
Diameter of vegetative cell 14–16 μ.	12. *O. australe.*
Wall of oospore areolate.	13. *O. areoliferum.*

III

Wall of oospore echinate. — 14. *O. santurcense.*
Wall of oospore scrobiculate.
  Oogonium 23–33 μ in diameter. — 15. *O. moniliforme.*
  Oogonium 44–52 μ in diameter — 78*a*. *O. argenteum* var. *michiganense.*

Wall of oospore smooth.
  Monoecious.
    Pore a little above median.
      Diameter of oogonium 34–45 μ.
        Oospore depressed-globose. — 16. *O. obsoletum.*
        Oospore regularly globose. — 17. *O. plusiosporum.*
      Diameter of oogonium 46–55 μ. — *O. urbicum.*
    Pore nearly superior.
      Oospore 31–41 by 30–41 μ. — 18. *O. varians.*
      Oospore 40–48 by 40–48 μ. — 19. *O. tyrolicum.*
    Pore variable between median and superior.
      Terminal cell narrowed and often setiferous. — *O. inflatum.*
      Terminal cell neither narrowed nor setiferous. — *O. urbicum.*
  Dioecious.
    Pore a little above median.
      Vegetative cell 1–3 diameters long. — *O. cardiacum* f. *pulchellum.*
      Vegetative cell 3–7 diameters long. — 20. *O. cardiacum.*
    Pore nearly superior.
      Diameter of vegetative cell 8–12 μ. — 21. *O. Franklinianum.*
      Diameter of vegetative cell 12–16 μ. — 18. *O. varians.*
      Diameter of vegetative cell 14–30 μ.
        Oospore depressed-globose, 28–43 μ in diameter. — 22. *O. Lemmermannii.*
        Oospore subglobose, 42–49 μ in diameter. — 23. *O. glabrum.*
        Oospore globose, 43–58 μ in diameter. — *O. cardiacum* f. *interjectum.*
        Oospore ellipsoid-globose, 40–52 μ in diameter — 20*a*. *O. cardiacum* var. *carbonicum.*
    Pore variable between median and superior.
      Oospore not filling oogonium. — *O. inflatum.*
      Oospore completely filling oogonium. — 24. *O. lautumniarum.*

IV

Wall of oospore echinate. — 14. *O. santurcense.*
Wall of oospore punctate. — *O. paraguayense.*
Wall of oospore smooth.
  Plants monoecious.
    Diameter of vegetative cell 8–34 μ.
      Diameter of oogonium 32–36 (40) μ.
        Vegetative cell 8–14 μ in diameter.
          Oogonium 42–46 μ long.
            Oospore 28–31 μ in diameter. — 25. *O. Hirnii.*
            Oospore 30–37 μ in diameter. — 26. *O. globosum.*
          Oogonium about 53 μ long. — *O. Warmingianum.*
        Vegetative cell 15–18 μ in diameter. — 27. *O. intermedium.*
      Diameter of oogonium 36–63 μ.
        Mature filament usually of 6–10 cells. — *O. zigzag.*
        Mature filament usually of 10–20 cells. — 1. *O. curtum.*
        Mature filament usually of more than 20 cells.
          Oospore globose to subglobose.
            Diameter of vegetative cell 12–19 μ.
              Oospore completely filling oogonium.
                Oogonium 38–45 by 40–50 μ. — *O. fragile* var. *abyssinicum.*
                Oogonium 42–50 by 44–55 μ. — 28. *O. fragile.*
              Oospore not filling oogonium.
                Vegetative cell 10–15 μ in diameter. — *O. intermedium* var. *szechwanense.*
                Vegetative cell 17–19 μ in diameter. — 29. *O. fennicum.*
            Diameter of vegetative cell 19–34 μ.
              Oogonium usually globose. — *O. robustum.*
              Oogonium usually ovoid. — 30. *O. Vaucherii.*
              Oogonium usually obovoid. — *O. brevicingulatum.*
          Oospore obovoid to ellipsoid.
            Oogonium basally inflated. — 31. *O. pseudo-Boscii.*
            Oogonium not basally inflated.
              Oospore 35–43 μ in diameter.
                Division of antheridium vertical. — 32. *O. Sodiroanum.*
                Division of antheridium horizontal. — 33. *O. Richterianum.*
              Oospore 42–47 μ in diameter. — 34. *O. upsaliense.*
              Oospore 46–53 μ in diameter. — 35. *O. oviforme.*
    Diameter of vegetative cell 33–37 μ. — 36. *O. martinicense.*
    Diameter of vegetative cell 37–54 μ.

Diameter of oogonium 53–67 μ. *O. suboctangulare.*
Oogonium rectangular in optical section.
Oogonium obovoid to obovoid-globose. 37. *O. geniculatum.*
Diameter of oogonium 70–95 μ. 38. *O. Kurzii.*
Plants dioecious.
Diameter of vegetative cell 11–14 μ.
Oogonium 30–36 μ in diameter. 39. *O. lageniforme.*
Oogonium about 43 by 75 μ. *O. herjedalicum.*
Diameter of vegetative cell 14–70 μ.
Oogonium scarcely exceeding vegetative cell in diameter.
Oospore globose to subglobose. 40. *O. anomalum.*
Oospore globose to cylindric-globose or subcylindric. 41. *O. capillare.*
Oospore ovoid to broadly ellipsoid. *O. Stephensiae.*
Oogonium noticeably exceeding vegetative cell in diameter.
Oospore globose, subglobose, or cylindric-globose.
Antheridial filament of same diameter as oogonial filament.
Oogonium 36–42 μ in diameter. 42. *O. gracilius.*
Oogonium 42–49 μ in diameter. 43. *O. plagiostomum.*
Oogonium 54–63 μ in diameter.
Vegetative cell 16–26 by 112–250 μ. 23. *O. glabrum.*
Vegetative cell 33–43 by 40–155 μ. 44. *O. princeps.*
Antheridial filament smaller than oogonial filament.
Oogonium 36–56 μ in diameter.
Division of antheridium vertical. 45. *O. biforme.*
Division of antheridium horizontal.
Vegetative cell of male filament 18–33 μ in diameter.
Oospore usually cylindric-globose. 46. *O. capilliforme.*
Oospore usually globose to subglobose.
Oogonium 40–53 by 40–65 μ. *O. capilliforme* var. *Lorentzii.*
Oogonium 46–56 by 52–66 μ. 46*a*. *O. capilliforme* f. *Debaryanum.*
Oogonium 37–53 by 43–60 μ. 46*b*. *O. capilliforme* var. *australe.*
Vegetative cell of male filament 33–40 μ in diameter. 47. *O. diversum.*
Oogonium 55–65 μ in diameter. 40. *O. anomalum.*
Oogonium 70–85 μ in diameter. 48. *O. rivulare.*
Oospore ellipsoid, obovoid, subcylindric, or subellipsoid.
Diameter of oogonium 35–63 (68) μ.
Antheridial filament larger than oogonial filament. 49. *O. pachyandrium.*
Antheridial filament not larger than oogonial filament.
Vegetative cell 1–3 diameters long.
Oospore 35–65 μ long. 41. *O. capillare.*
Oospore 63–80 μ long. 50. *O. mexicanum.*
Vegetative cell 2–6 diameters long.
Cell-diameter of antheridial filament 18–28 μ.
Oogonium usually obovoid. 51*a*. *O. grande* var. *aequatoriale.*
Oogonium usually subobovoid. 45. *O. biforme.*
Cell-diameter of antheridial filament 28–33 μ. 51. *O. grande.*
Cell-diameter of antheridial filament 32–42 μ. 52. *O. majus*
Cell-diameter of antheridial filament 42–53 μ. *O. Stephensiae.*
Vegetative cell 3–11 diameters long.
Division of antheridium horizontal. 20*a*. *O. cardiacum* var. *carbonicum.*
Division of antheridium vertical.
Oogonium usually obovoid. 53. *O. oboviforme.*
Oogonium usually cylindric-obovoid. 45. *O. biforme.*
Oogonium usually subobovoid or ellipsoid-ovoid.
Diameter of oogonium 42–52 μ. 54. *O. angustum.*
Diameter of oogonium 49–68 μ.
Diameter of vegetative cell 20-27 μ. *O. grande* f. *gemelliparum.*
Diameter of vegetative cell 28–37 μ. 51. *O. grande.*
Diameter of vegetative cell 36–46 μ. 52. *O. majus.*
Diameter of oogonium (60) 63–90 μ.
Oospore not filling oogonium longitudinally. *O. Stephensiae.*
Oospore not filling oogonium in any direction. 48. *O. rivulare.*

Oospore nearly or quite filling oogonium.	
Vegetative cell 1–6 diameters long.	
Diameter of antheridial filament 30–37 μ.	
Oospore obovoid to ellipsoid.	55. *O. Landsboroughi.*
Oospore ellipsoid to globose-ellipsoid.	56. *O. crassum.*
Diameter of antheridial filament 36–50 μ.	
Oospore 67–100 μ long.	
Diameter of oogonium 64–73 μ.	55*a*. *O. Landsboroughi* var. *norvegicum.*
Diameter of oogonium 75–90 μ.	
Vegetative cell 1–3 diameters long.	57. *O. amplum.*
Vegetative cell 3–5 diameters long.	*O. crassum* var. *sublumidum.*
Oospore 100–125 μ long.	58. *O. longum.*
Vegetative cell 6–10 diameters long.	59. *O. subrectum.*
Diameter of oogonium 98–100 μ.	*O. columbianum.*
Oospore variable, globose to ellipsoid.	56. *O. crassum.*
Diameter of vegetative cell 70–93 μ.	
Oospore globose to ellipsoid.	60. *O. fabulosum.*
Oospore subglobose to subcylindric.	*O. maximum.*
Plants with reproductive structures imperfectly known.	
Diameter of vegetative cell 6–24 (27) μ.	
Oogonium about 35 by 53 μ.	*O. Warmingianum.*
Oogonium about 43 by 75 μ.	*O. herjedalicum.*
Oogonium 37–49 by 54–76 μ.	*O. inflatum.*
Diameter of vegetative cell 24–40 μ.	228. *O. Oryzae.*
Wall of oospore longitudinally costate.	
Oospore with outer wall costate.	61. *O. exocostatum.*
Oospore with middle wall costate.	
Costae continuous and entire.	
Costae 15–22 in number.	
Vegetative cell 10–15 μ in diameter.	
Monoecious.	62. *O. paulense.*
Dioecious.	*O. orientale.*
Vegetative cell 24–30 μ in diameter.	*O. urceolatum.*
Costae 26–35 in number.	
Monoecious.	
Oospore completely filling oogonium.	
Oogonium 39–48 μ in diameter.	63. *O. paludosum.*
Oogonium 54–63 μ in diameter.	64. *O. carolinianum.*
Oospore not filling oogonium.	63*a*. *O. paludosum* var. *parvisporum.*
Dioecious.	
Oospore usually completely filling oogonium.	*O. leiopleurum.*
Oospore usually not filling oogonium.	
Oospore ellipsoid.	
Diameter of oogonium 31–38 μ.	65. *O. occidentale.*
Diameter of oogonium 39–51 μ.	66. *O. Boscii.*
Oospore ellipsoid-globose to subglobose.	66*a*. *O. Boscii* f. *dispar.*
Oospore ellipsoid-obovoid to obovoid.	*O. Boscii* var. *notabile.*
Costae 35–45 in number.	*O. Kjellmanii.*
Costae granulate, crenate, crenulate, or pitted.	
Costae 12–20 in number.	
Costae crenulate.	67. *O. crenulatocostatum.*
Costae crenate.	68. *O. longiarticulatum.*
Costae 30–35 in number.	*O. margaritiferum.*
Costae 35–45 in number.	*O. Kjellmanii.*
Costae dentate.	
Costae connected by transverse ridges.	69. *O. aureum.*
Costae not connected by transverse ridges.	68. *O. longiarticulatum.*
Wall of oospore areolate.	
Dioecious.	
Diameter of oogonium 30–35 μ.	69. *O. aureum.*
Diameter of oogonium 48–60 μ.	70. *O. areolatum.*
Diameter of oogonium 66–72 μ.	*O. Hoehnei.*
Monoecious.	
Oogonium 31–35 μ in diameter.	71. *O. subareolatum.*
Oogonium 41–55 μ in diameter.	84. *O. arcyosporum.*
Wall of oospore reticulate.	
Oogonium 33–40 by 38–46 μ.	72. *O. dictyosporum.*
Oogonium about 42 by 52 μ.	*O. dictyosporum* f. *Westii.*
Wall of oospore pitted or scrobiculate.	
Monoecious.	
Outer spore-wall scrobiculate.	73. *O. foveolatum.*
Middle spore-wall scrobiculate.	*O. excavatum.*
Dioecious.	

Diameter of vegetative cell 10–25 (28) μ.
Suffultory cell enlarged.
Diameter of oogonium 40–48 μ. 74. *O. scrobiculatum.*
Diameter of oogonium 56–68 μ. 75. *O. verrucosum.*
Diameter of oogonium 64–76 μ. 76. *O. Tiffanyi.*
Suffultory cell not enlarged.
Diameter of oogonium 38–45 μ. 77. *O. punctatum.*
Diameter of oogonium 44–64 μ.
Length of oogonium 48–65 μ.
Outer spore-wall scrobiculate. 78. *O. argenteum.*
Middle spore-wall scrobiculate.
Length of oogonium 68–112 μ. 79. *O. figuratum.*
Diameter of oogonium 61–73 μ. 80. *O. Wyliei.*
O. Ilsteri.
Suffultory cell variable, enlarged or not. 81. *O. indianense.*
Diameter of vegetative cell 25–48 μ.
Length of oogonium 48–70 μ. 82. *O. americanum.*
Length of oogonium 81–113 μ. 83. *O. taphrosporum.*
Reproductive structures imperfectly known.
Oogonium 35–38 by 53–58 μ. *O. capense.*
Oogonium 53–69 by 67–106 μ. 235. *O. giganteum.*

V

Oospore smooth. 39. *O. lageniforme.*
Oospore scrobiculate.
Oogonium 48–56 μ in diameter. 79. *O. figuratum.*
Oogonium 61–73 μ in diameter. *O. Ilsteri.*

VI

Wall of oospore echinate. *O. velatum.*
Wall of oospore scrobiculate. *O. acmandrium* var. *stictospermum.*
Wall of oospore punctate-granulate. 115*e*. *O. crispum* var. *granulosum.*
Wall of oospore coarsely reticulate. 85. *O. reticulocostatum.*
Wall of oospore longitudinally costate.
Division of oogonium supreme. 86. *O. pseudacrosporum.*
Division of oogonium superior.
Costae 15–28 in number.
Diameter of oogonium 38–48 μ.
Dioecious. *O. costatosporum.*
Monoecious. 87. *O. eriense.*
Diameter of oogonium 48–52 μ. 88. *O. paucostriatum.*
Diameter of oogonium 54–60 μ. 89. *O. paucocostatum.*
Diameter of oogonium 59–74 μ. *O. australianum.*
Costae 30–50 in number.
Antheridium and oogonium in same filament.
Oospore 48–55 by 50–58 μ. 90. *O. nobile.*
Oospore 54–59 by 68–80 μ. 90*a*. *O. nobile* var. *minus.*
Oospore 65–75 by 88–104 μ. *O. insigne.*
Antheridium and oogonium in separate filaments. *O. tumidulum.*
Antheridium unknown. *O. sol.*
Wall of oospore smooth.
Oogonium with median plications. *O. excisum.*
Oogonium with projections.
Projections mammiform. 91. *O. mammiferum.*
Projections conically obtuse.
Diameter of vegetative cell 5–7 μ. *O. Itzigsohnii* var. *minus.*
Diameter of vegetative cell 8–10 μ. 92. *O. Itzigsohnii.*
Projections intermediate between mammiform and conically obtuse. *O. Itzigsohnii* f. *heteromorphum.*
Oogonium with neither projections nor plications.
Oogonium with a median constriction. 227. *O. pusillum.*
Oogonium without a median constriction.
Division of oogonium basal.
Monoecious. 93. *O. Brittonii.*
Dioecious.
Diameter of oogonium 27–36 μ. 94. *O. Howei.*
Diameter of oogonium 40–48 μ. 95. *O. infimum.*
Division of oogonium inferior. 96. *O. inversum*
Division of oogonium median.
Oogonium 13–20 μ in diameter. 236. *O. inconspicuum.*
Oogonium 13–18 by 18–23 μ. *O. fusum.*
Oogonium 14–15 by 31–35 μ. 231. *O. tapeinosporum.*
Oogonium 15–19 by 18–23 μ.
Oogonium 20–40 μ in diameter.
Monoecious.
Oospore 22–27 μ in diameter. 97. *O. Gunnii.*
Oospore 28–33 μ in diameter.

Oogonium subglobose.	98. *O. acmandrium.*
Oogonium pyriform-globose.	99. *O. psaegmatosporum.*
Dioecious.	
Diameter of oogonium 23–33 μ.	100. *O. Howardii.*
Diameter of oogonium 33–40 μ.	101. *O. pratense.*
Antheridium unknown.	234. *O. poecilosporum.*
Division of oogonium supramedian.	
Monoecious.	*O. Petri.*
Dioecious.	102. *O. mitratum.*
Antheridium unknown.	
Oogonium 15–20 by 15–23 μ.	*O. virceburgense.*
Oogonium 27–28 by 26–28 μ.	229. *O. consociatum.*
Division of oogonium superior.	
Plants dioecious.	
Diameter of oogonium 13–16 μ.	*O. trioicum.*
Diameter of oogonium 16–43 μ.	
Oospore globose to depressed-globose.	
Diameter of oogonium 18–27 μ.	102. *O. mitratum.*
Diameter of oogonium 28–36 μ.	
Oogonium 26–38 μ long.	103. *O. abbreviatum.*
Oogonium 36–45 μ long.	104*a*. *O. Pringsheimii* var. *Nordstedtii.*
Diameter of oogonium 35–43 μ.	104. *O. Pringsheimii.*
Oospore ovoid, oblong, or ellipsoid.	
Diameter of oogonium 16–20 μ.	105. *O. epiphyticum.*
Diameter of oogonium 23–29 μ.	
Oospore filling oogonium longitudinally.	
Basal cell elongate.	106. *O. pisanum.*
Basal cell subhemispheric.	107. *O. nanum.*
Oospore not filling oogonium longitudinally.	108. *O. porrectum.*
Diameter of oogonium 28–33 μ.	230. *O. Sancti-thomae.*
Diameter of oogonium 33–45 μ.	*O. porrectum* var. *africanum.*
Diameter of oogonium 43–50 μ.	109. *O. Welwitschii.*
Diameter of oogonium 52–60 μ.	110. *O. iowense.*
Diameter of oogonium 61–68 μ.	*O. peipingense.*
Diameter of oogonium about 82 μ.	*O. dioicum.*
Plants monoecious.	
Oogonium pyriform to subpyriform.	
Diameter of vegetative cell 8–13 μ.	
Diameter of oogonium 23–33 μ.	
Oospore globose or ellipsoid.	
Oospore filling oogonium.	111. *O. Pithophorae.*
Oospore not filling oogonium.	*O. simplex.*
Oospore subglobose to depressed-globose.	
Oogonium 23–28 by 23–40 μ.	112. *O. loricatum.*
Oogonium 30–33 by 31–35 μ.	*O. pyrulum.*
Diameter of oogonium 34–40 μ.	113. *O. amplius.*
Diameter of vegetative cell 13–16 μ.	114. *O. pyriforme.*
Oogonium obovoid-globose to subglobose.	
Vegetative cell 8–16 μ in diameter.	
Oospore filling oogonium.	
Diameter of oogonium 23–28 μ.	112. *O. loricatum.*
Diameter of oogonium 30–50 μ.	115. *O. crispum.*
Oospore not filling oogonium.	
Diameter of oogonium 30–38 μ.	115*d*. *O. crispum* var. *hawaiense.*
Diameter of oogonium 40–43 μ.	116. *O. obesum.*
Vegetative cell 16–27 μ in diameter.	
Oogonium 39–45 μ in diameter.	117. *O. autumnale.*
Oogonium 45–58 μ in diameter.	118. *O. rupestre.*
Oogonium ellipsoid to oblong.	
Oogonium 9–14 μ in diameter.	*O. Selandiae.*
Oogonium 13–19 μ in diameter.	
Length of oogonium 25–28 μ.	*O. trioicum.*
Length of oogonium 34–40 μ.	119. *O. gracillimum.*
Oogonium 20–29 μ in diameter.	
Oospore nearly or quite filling oogonium.	
Vegetative cell 7–9 by 11–36 μ.	120. *O. oblongellum.*
Vegetative cell 8–15 by 16–60 μ.	*O. Kirchneri.*
Oospore not filling oogonium longitudinally.	
Oospore globose.	121. *O. Hallasiae.*
Oospore ellipsoid.	122. *O. oblongum.*
Oospore oblong-ellipsoid.	*O. gracillimum* f. *majus.*
Oospore variable, filling oogonium or not.	*O. oblongum* var. *fusiforme.*
Oogonium 35–42 μ in diameter.	123. *O. Ahlstrandii.*
Oogonium 50–70 μ in diameter.	124. *O. pachydermum.*

VII

Oogonium opening by a pore.	
Pore inferior.	
Oospore costate.	125. *O. Huntii.*
Oospore echinate.	126. *O. hispidum.*
Oospore dentate.	
Oogonium 39–46 by 40–47 μ.	*O. exoticum.*
Oogonium 47–60 by 48–63 μ.	*O. Cleveanum.*
Pore inframedian.	
Wall of oospore smooth.	142. *O. gallicum.*
Wall of oospore reticulate-verrucose.	127. *O. fuscum.*
Wall of oospore echinate.	
Oogonium 38–45 μ long.	*O. inframediale.*
Oogonium 52–64 μ long.	128. *O. canadense.*
Pore median or nearly so.	
Wall of oospore reticulate-verrucose.	127. *O. fuscum.*
Wall of oospore punctate.	129. *O. nebraskense.*
Wall of oospore echinate.	
Suffultory cell enlarged.	130. *O. hystricinum.*
Suffultory cell not enlarged, or only slightly so.	
Diameter of vegetative cell 7–13 μ.	131. *O. Aster.*
Diameter of vegetative cell 12–16 μ.	132. *O. pungens.*
Diameter of vegetative cell 17–30 μ.	
Oogonium 36–38 μ in diameter.	*O. subglobosum.*
Oogonium 38–50 μ in diameter.	
Oospore globose.	133. *O. echinospermum.*
Oospore ellipsoid.	134. *O. Hystrix.*
Wall of oospore spirally costate.	
Suffultory cell enlarged.	
Outer spore-wall granulate.	135. *O. spiripennatum.*
Outer spore-wall not granulate.	
Oogonium 40–44 μ in diameter.	136. *O. exospirale.*
Oogonium 42–50 μ in diameter.	*O. spiralidens.*
Oogonium 49–60 μ in diameter.	137. *O. illinoiense.*
Suffultory cell not enlarged.	
Diameter of oospore 35–45 μ.	
Vegetative cell 14–20 μ in diameter.	*O. pseudospirale.*
Vegetative cell 20–26 μ in diameter.	138. *O. acutum.*
Diameter of oospore 46–56 μ.	139. *O. spirale.*
Wall of oospore smooth.	
Oospore globose to subglobose.	
Vegetative cell 8–9 μ in diameter.	140. *O. depressum.*
Vegetative cell 9–12 μ in diameter.	*O. semiapertum.*
Vegetative cell 12–23 μ in diameter.	
Diameter of oogonium 23–30 μ.	*O. Braunii* var. *hafniense.*
Diameter of oogonium 30–37 μ.	141. *O. Braunii.*
Diameter of oogonium 39–48 μ.	142. *O. gallicum.*
Diameter of oogonium 49–52 μ.	143. *O. flavescens.*
Oospore ovoid.	144. *O. Zehneri.*
Oospore sexangular-ellipsoid.	
Oogonium 19–30 μ in diameter.	145. *O. angulosum.*
Oogonium 29–33 μ in diameter.	146. *O. sexangulare.*
Oogonium 36–42 μ in diameter.	147. *O. subsexangulare.*
Pore supramedian.	
Oospore-wall punctate.	129. *O. nebraskense.*
Oospore-wall spirally costate.	226. *O. latviense.*
Oospore-wall smooth.	
Oogonium 40–43 by 33–38 μ.	148. *O. magnum.*
Oogonium 94–98 by 146–150 μ.	*O. sinense.*
Oospore-wall echinate.	
Vegetative cell 6–8 μ in diameter.	149. *O. excentriporum.*
Vegetative cell 14–17 μ in diameter.	*O. manschuricum.*
Pore superior.	
Oospore-wall dentate.	150. *O. stellatum.*
Oospore-wall costate.	
Costae arranged spirally.	226. *O. latviense.*
Costae arranged longitudinally.	
Costae 16–25 in number.	
Oogonium 45–50 μ in diameter.	151. *O. incertum.*
Oogonium 48–65 μ in diameter.	
Oospore usually completely filling oogonium.	
Oogonium 48–57 μ in diameter.	*O. cyathigerum* var. *hormosporum.*
Oogonium 57–66 μ in diameter.	152. *O. cyathigerum.*
Oospore incompletely filling oogonium.	152*b*. *O. cyathigerum* var. *ellipticum.*
Oogonium 65–85 μ in diameter.	153. *O. perfectum.*
Costae 25–35 in number	

Costae entire.	154. *O. Wolleanum.*
Costae crenulate.	154*a*. *O. Wolleanum* var. *concinnum.*
Costae 35–40 in number.	155. *O. strictum.*
Oospore-wall echinate.	
Spines arranged spirally.	
Oogonium 51–64 μ in diameter.	150. *O. stellatum.*
Oogonium 63–78 μ in diameter.	
Dwarf male stipe 11–15 by 50–65 μ.	*O. Donnellii* var. *Wittrockianum.*
Dwarf male stipe 16–21 by 63–74 μ.	156. *O. Donnellii.*
Spines not arranged spirally.	
Diameter of oogonium 29–38 μ.	157. *O. armigerum.*
Diameter of oogonium 35–36 μ.	158. *O. echinatum.*
Diameter of oogonium 46–57 μ.	*O. Lindmanianum.*
Oospore-wall pitted.	
Pits in both vertical and transverse rows.	*O. rectangulare.*
Pits in vertical rows only, in concentric rings, or irregularly arranged.	159. *O. concatenatum.*
Oospore-wall smooth.	
Suffultory cell enlarged.	
Diameter of oogonium 33–65 (68) μ.	
Oospore 28 by 28 μ.	160. *O. silvaticum.*
Oospore 30–46 by 37–60 μ.	161. *O. Borisianum.*
Oospore 49–65 by 49–81 μ.	162. *O. Westii.*
Diameter of oogonium 65–80 μ.	
Suffultory cell 26–40 μ in diameter.	*O. alternans.*
Suffultory cell about 44 μ in diameter.	*O. Kitulae.*
Suffultory cell not enlarged.	
Diameter of vegetative cell 10–20 μ.	
Oogonium 24–35 μ in diameter.	163. *O. multisporum.*
Oogonium 35–45 μ in diameter.	164. *O. irregulare.*
Diameter of vegetative cell 21–40 μ.	
Oogonium 39–60 μ in diameter.	
Vegetative cell 1–3 diameters long.	
Oospore not filling oogonium.	165. *O. victoriense.*
Oospore nearly or quite filling oogonium.	166. *O. crassiusculum.*
Vegetative cell 3–6 diameters long.	
Gynandrosporous.	166. *O. crassiusculum.*
Idioandrosporous.	167. *O. idioandrosporum.*
Oogonium 65–80 μ in diameter.	*O. alternans.*
Oogonium opening by a lid.	
Division of oogonium inframedian.	
Oogonium without folds.	168. *O. contortum.*
Oogonium with folds.	
Suffultory cell enlarged.	
Diameter of oogonium 23–26 μ.	*O. pulchrum.*
Diameter of oogonium 28–32 μ.	*O. platygynum* var. *continuum.*
Suffultory cell not enlarged.	
Oogonium 16–23 μ in diameter.	*O. Lagerstedtii.*
Oogonium 23–29 μ in diameter.	*O. Uleanum.*
Division of oogonium median.	
Oogonium longitudinally plicate.	
Diameter of oogonium 16–18 μ.	*O. crenulatum* var. *gracilius.*
Diameter of oogonium 25–27 μ.	*O. crenulatum.*
Oogonium not longitudinally plicate.	
Oogonium 13–16 μ in diameter.	169. *O. longicolle.*
Oogonium 16–20 μ in diameter.	170. *O. senegalense.*
Oogonium 21–26 μ in diameter.	171. *O. Rothii.*
Oogonium 25–31 μ in diameter.	
Gynandrosporous.	*O. decipiens* var. *bernardense.*
Idioandrosporous.	172*b*. *O. decipiens* var. *africanum.*
Oogonium 30–38 μ in diameter	172. *O. decipiens.*
Oogonium 39–46 μ in diameter.	173. *O. macrospermum.*
Oogonium 89–100 μ in diameter.	*O. perspicuum.*
Division of oogonium supramedian.	
Oogonium with verticillate folds.	
Diameter of oogonium 23–28 μ.	*O. plicatulum.*
Diameter of oogonium 50–55 μ.	174. *O. costatum.*
Diameter of oogonium 58–65 μ.	*O. boreale.*
Oogonium without verticillate folds.	
Vegetative cell 4–7 μ in diameter.	*O. danicum.*
Vegetative cell 13–24 μ in diameter.	*O. mirandrium.*
Division of oogonium superior.	
Oospore-wall crenulate.	175*b*. *O. rugulosum* var. *minutum.*

Oospore-wall pitted.	
Oospore-wall echinate.	176. *O. Schmidlei.*
Oospore-wall longitudinally costate.	*O. velatum.*
Oospore-wall scrobiculate.	177. *O. Croasdaleae.*
Diameter of oogonium 30–39 μ.	
Suffultory cell enlarged.	178. *O. monile.*
Suffultory cell not enlarged.	179. *O. Ackleyae.*
Diameter of oogonium 40–50 μ.	
Suffultory cell 27–28 μ in diameter.	*O. exmonile.*
Suffultory cell 35–38 μ in diameter.	*O. Borgei.*
Diameter of oogonium 56–68 μ.	*O. eminens.*
Oospore-wall smooth.	
Vegetative cell 3–8 μ in diameter.	
Diameter of oogonium 14–20 μ.	
Oospore 17–20 μ long.	180. *O. longatum.*
Oospore 19–25 μ long.	175. *O. rugulosum.*
Diameter of oogonium 19–23 μ.	175*a*. *O. rugulosum* var. *rotundatum.*
Vegetative cell 8–32 μ in diameter.	
Oospore globose or subglobose.	
Suffultory cell enlarged.	
Diameter of vegetative cell 9–15 μ.	181. *O. hians.*
Diameter of vegetative cell 13–20 μ.	*O. mirandrium.*
Suffultory cell not enlarged.	
Vegetative cell $\frac{3}{4}$ to $2\frac{1}{2}$ diameters long.	
Diameter of vegetative cell 12–14 μ.	182. *O. laetevirens.*
Diameter of vegetative cell 14–21 μ.	183*b*. *O. macrandrium* f. *lundense.*
Diameter of vegetative cell 21–29 μ.	185. *O. pluviale.*
Vegetative cell 2–8 diameters long.	
Oospore 24–37 by 24–39 μ.	183. *O. macrandrium.*
Oospore 35–40 by 36–45 μ.	*O. acuminatum.*
Oospore ellipsoid, subellipsoid, or ovoid.	
Terminal cell setiform.	184. *O. ciliatum.*
Terminal cell not setiform.	
Diameter of vegetative cell 7–12 μ.	*O. hoersholmiense.*
Diameter of vegetative cell 14–32 μ.	
Oospore 27–32 μ in diameter.	232. *O. flexuosum.*
Oospore 32–42 μ in diameter.	
Vegetative cell 3 diameters long or less.	
Oogonium globose-obovoid.	233. *O. fonticola.*
Oogonium subglobose.	185. *O. pluviale.*
Vegetative cell 3–5 diameters long.	*O. implexum.*
Oospore 41–48 μ in diameter.	186. *O. spectabile.*
Division of oogonium supreme.	
Oospore-wall smooth.	
Diameter of oogonium 42–55 μ.	187. *O. obtruncatum.*
Diameter of oogonium 55–85 μ.	225. *O. completum.*
Oospore-wall longitudinally costate.	
Costae 11–30 in number.	188. *O. acrosporum.*
Costae 40–45 in number.	189. *O. tentoriale.*
VIII	
One species only.	190. *O. Reinschii.*
IX	
Dwarf male present.	
Oogonium 42–56 μ in diameter.	191. *O. undulatum.*
Oogonium 56–68 μ in diameter.	192. *O. sinuatum.*
Dwarf male absent.	
Diameter of oogonium 18–23 μ.	*O. sphaerandrium.*
Diameter of oogonium 48–57 μ.	193. *O. nodulosum.*
Diameter of oogonium 64–74 μ.	194. *O. commune.*
X	
Vegetative cell punctate or granulate.	
Diameter of vegetative cell 4–8 μ.	195. *O. elegans* var. *americanum.*
Diameter of vegetative cell 9–13 μ.	196. *O. minus.*
Diameter of vegetative cell 16–24 μ.	197. *O. spirostriatum.*
Vegetative cell neither punctate nor granulate.	
Dwarf male absent.	
Dioecious, macrandrous.	
Divsion of oogonium basal.	
Oogonium 27–36 μ in diameter.	94. *O. Howei.*
Oogonium 40–48 μ in diameter.	95. *O. infimum.*
Division of oogonium inferior.	96. *O. inversum.*
Division of oogonium median.	
Oogonium 26–32 μ in diameter.	100. *O. Howardii.*
Oogonium 32–36 μ in diameter.	198. *O. latiusculum.*
Division of oogonium superior.	

Oospore smooth, 11–20 by 13–17 μ. — *O. operculatum.*
Oospore scrobiculate, 54–67 by 54–67 μ. — 224. *O. suborbiculare.*
Monoecious.
Oogonium opening by a pore. — 199. *O. patulum.*
Oogonium opening by a lid.
Diameter of oogonium 15–30 μ.
Division of oogonium median.
Oogonium subdepressed-globose. — 200. *O. capitellatum.*
Oogonium angular-globose. — *O. quadratum.*
Division of oogonium supramedian.
Diameter of oogonium 15–20 μ. — *O. virceburgense.*
Diameter of oogonium 18–23 μ. — *O. sphaerandrium.*
Diameter of oogonium 26–30 μ. — 201. *O. spurium.*
Diameter of oogonium 30–46 μ.
Division of oogonium basal. — 93. *O. Brittonii.*
Division of oogonium superior.
Oogonium 30–33 μ in diameter. — 202. *O. ouchitanum.*
Oogonium 42–45 μ in diameter. — 203. *O. bohemicum.*
Dwarf male present.
Oogonium opening by a pore.
Wall of oospore punctate. — 129. *O. nebraskense.*
Wall of oospore longitudinally costate. — 204. *O. Taylorii.*
Wall of oospore smooth. — 161. *O. Borisianum.*
Oogonium opening by a lid.
Division of oogonium median.
Oogonium with narrow division.
Oogonium 28–35 by 23–38 μ. — 172*a*. *O. decipiens* var. *dissimile.*
Oogonium 46–64 by 44–54 μ. — *O. bengalense.*
Oogonium 57–64 by 48–53 μ. — *O. indicum.*
Oogonium with wide division.
Diameter of oospore 22–26 μ.
Gynandrosporous only. — 205. *O. Areschougii.*
Gynandrosporous and idioandrosporous. — 206. *O. subplenum.*
Diameter of oospore 26–30 μ. — 205*a*. *O. Areschougii* var. *contortifilum.*
Diameter of oospore 30–32 μ. — 207. *O. pseudoplenum.*
Diameter of oospore 42–48 μ.
Vegetative cell 14–19 μ in diameter. — *O. bengalense.*
Vegetative cell 19–26 μ in diameter. — 208. *O. confertum.*
Diameter of oospore 48–53 μ. — 209. *O. brasiliense.*
Division of oogonium supramedian.
Diameter of oogonium 14–26 μ. — 210. *O. clavatum.*
Diameter of oogonium 27–42 μ.
Oogonium 19–25 μ long. — *O. exostrictum.*
Oogonium 25–32 μ long. — 211. *O. oelandicum.*
Oogonium 40–45 μ long. — 212. *O. megaporum.*
Diameter of oogonium 42–55 μ.
Oospore 33–43 μ in diameter.
Oogonium with 10–16 longitudinal folds. — 211*a*. *O. oelandicum* var. *novae-angliae.*
Oogonium with 16–22 longitudinal folds. — 213. *O. Jaoii.*
Oospore 48–53 μ in diameter. — 174. *O. costatum.*
Diameter of oogonium 58–65 μ. — *O. boreale.*
Division of oogonium inframedian.
Suffultory cell enlarged. — *O. platygynum* var. *continuum.*
Suffultory cell not enlarged (or only rarely so). — 214. *O. circinatum.*
Diameter of vegetative cell 3–6 μ.
Diameter of vegetative cell 6–10 μ.
Gynandrosporous only. — *O. platygynum* var. *novae-zelandiae.*
Idioandrosporous only. — *O. platygynum* f. *obtusum.*
Gynandrosporous and idioandrosporous. — 215. *O. platygynum.*
Diameter of vegetative cell 10–13 μ. — 216. *O. ambiceps.*
Diameter of vegetative cell 12–15 μ. — *O. bahusiense.*
Division of oogonium superior.
Oogonium 35–43 μ in diameter. — 217. *O. rigidum.*
Oogonium 43–55 μ in diameter.
Oospore 36–40 μ long. — 218. *O. Taftii.*
Oospore 44–58 μ long. — 219. *O. Collinsii.*
Division of oogonium supreme. — 220. *O. michiganense.*
Oospore-wall longitudinally costate.
Oospore-wall smooth.
Idioandrosporous.
Oogonium 48–60 by 62–74 μ. — 221. *O. praticolum.*
Oogonium 66–78 by 72–90 μ. — 222. *O. supremum.*
Gynandrosporous.

Diameter of oogonium 36–42 μ. 223. *O. wabashense.*
Diameter of oogonium 42–55 μ. 187. *O. obtruncatum.*
Diameter of oogonium 55–58 μ. 225. *O. completum.*
Reproductive structures imperfectly known.
Vegetative cell 2–3 μ in diameter. *O. fusum.*
Vegetative cell 4–6 μ in diameter. *O. virceburgense.*

1. **Oedogonium curtum** Wittr. & Lundell; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 121. 1870.

Monoecious; oogonia 1–4, obovoid-globose or subglobose, pore superior; oospore of same form as oogonium, which it nearly fills; spore-wall smooth, often thick; suffultory cell occasionally larger than vegetative cell; antheridia 1–4, subepigynous, sometimes terminal; sperms 2, division horizontal; basal cell elongate; vegetative cell sometimes spirally punctate, 12–22 by 25–110 μ; oogonium 38–55 by 37–54 μ; oospore 36–52 by 35–51 μ; antheridium 10–17 by 8–13 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan, Wyoming.
PLATE 9. *f. 115.*

2. **Oedogonium punctatostriatum** De Bary, Abh. Senck. Nat. Ges. **1**: 47. 1854.

Dioecious, macrandrous; oogonium 1, depressed-globose, operculate; division median, rather wide and distinct; oospore depressed-globose, not filling oogonium; spore-wall smooth; antheridia to 10-seriate; sperm 1; wall of vegetative cell and oogonium spirally punctate; basal cell depressed-globose or subhemispheric, its wall vertically plicate; female vegetative cell 18–22 by 38–128 μ, male 16–19 by 33–108 μ; oogonium 48–55 by 38–48 μ; oospore 40–51 by 35–42 μ; antheridium 16–19 by 6–12 μ; basal cell 28–31 by 21–25 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Michigan, Illinois, Iowa, Florida; British Columbia; Greenland.
PLATE 23. *f. 364, 365.*

3. **Oedogonium curvum** Pringsh. Jahrb. Wiss. Bot. **1**: 69. 1857.

Monoecious; oogonia 1–6, depressed-globose, pore median; oospore depressed-globose, filling or not filling oogonium; spore-wall smooth; antheridia hypogynous or epigynous or scattered, 1–7; sperm 1; basal cell elongate; filament usually irregularly curved; vegetative cell 5–10 by 10–40 μ; oogonium 21–25 by 18–24 μ; oospore 19–23 by 14–19 μ; antheridium 6–9 by 6–9 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Indiana, Illinois, Iowa, Alabama.
PLATE 8. *f. 89, 90.*

4. **Oedogonium vulgare** (Wittr.) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium cryptoporum var. *vulgare* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 7. 1874.
(?) *Oedogonium spetsbergense* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 37. 1874.

Monoecious; oogonia 1–5, subdepressed-obovoid-globose or subdepressed-globose, pore median; oospore subdepressed-globose, quite filling oogonium; spore-wall smooth; antheridia 1–4, subepigynous or hypogynous or scattered; sperm single; vegetative cell 5–8 by 15–48 μ; oogonium 18–25 by 18–26 μ; oospore 16–23 by 15–19 μ; antheridium 5–7 by 9–12 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New Jersey, Pennsylvania, Michigan, Illinois, Oklahoma, Utah.
PLATE 8. *f. 103.*

5. **Oedogonium cryptoporum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 119. 1870.

Monoecious; oogonium 1, subdepressed-obovoid-globose or subdepressed-globose, pore median; oospore subdepressed-globose, quite filling oogonium; spore-wall smooth; antheridia

1–7, scattered or subhypogynous or subepigynous; sperm 1; vegetative cell 7–10 by 28–60 μ; oogonium 23–29 by 25–31 μ; oospore 20–27 by 19–22 μ; antheridium 6–8 by 7–11 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Ohio, Indiana, Michigan, Illinois, Iowa, Oklahoma, Wyoming, Utah.
PLATE 8. *f. 104*.

6. **Oedogonium laeve** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 8. 1874.

Monoecious; oogonium single, depressed-globose, pore median; oospore depressed-globose, filling oogonium; spore-wall smooth; antheridia 1–2, subepigynous; sperm 1; vegetative cell 10–14 by 20–70 μ; oogonium 32–38 by 24–30 μ; oospore 30–35 by 23–26 μ; antheridium 9–10 by 9–13 μ.

TYPE LOCALITY: France.
DISTRIBUTION: Michigan, Illinois.
PLATE 8. *f. 99*.

7. **Oedogonium rufescens** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 134. 1870.

Dioecious, macrandrous; oogonia 1–3, obovoid- or depressed-obovoid-globose, pore median, rimiform; oospore globose or depressed-globose, filling oogonium or nearly so; spore-wall smooth; antheridia to 12-seriate; sperm 1; female vegetative cell 8–10 by 34–70 μ, male 7–9 by 30–54 μ; oogonium 22–24 by 22–30 μ; oospore 21–23 by 17–22 μ; antheridium 6–8 by 8–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Rhode Island, Connecticut, Ohio, Michigan, Indiana, Illinois, Iowa, Missouri, North Carolina, Florida, Alabama, Oklahoma.
PLATE 8. *f. 100–102*.

7*a*. **Oedogonium rufescens** var. **exiguum** (Elfv.) Tiff. Oedog. Monog. 66. 1930. *Oedogonium exiguum* Elfv.; Hirn, Acta Soc. Faun. Fl. Fenn. **11**^{6}: 19. 1895. *Oedogonium rufescens* f. *exiguum* Hirn, Acta Soc. Sci. Fenn. **27**: 76. 1900. Vegetative cell a little smaller; oospore subdepressed-globose; antheridia 3; vegetative cell 5–9 by 22–88 μ; oogonium 22–24 by 20–28 μ; oospore 20–22 by 17–23 μ; antheridium 5 by 10–12 μ. TYPE LOCALITY: Finland. DISTRIBUTION: Illinois, Alabama, Mississippi, Oklahoma. PLATE 8. *f. 105*.

7*b*. **Oedogonium rufescens** var. **Lundellii** (Wittr.) Tiff. Ohio Jour. Sci. **29**: 75. 1929. *Oedogonium Lundellii* Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 32. 1874. *Oedogonium rufescens* subsp. *Lundellii* Hirn, Acta Soc. Sci. Fenn. **27**: 77. 1900. *Oedogonium rufescens* subsp. *Lundellii* f. *elongatum* Hirn, Acta Soc. Sci. Fenn. **27**: 78. 1900. Vegetative cell wider in proportion to oogonium than in the species; oogonium depressed-globose; vegetative cell 9–13 by 30–75 μ; oogonium 22–25 by 21–27 μ; oospore 19–23 by 15–22 μ; antheridium 7–9 by 6–12 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Maine, California. PLATE 8. *f. 106, 107*.

8. **Oedogonium sociale** Wittr.; Wittr. & Nordst. Algae Exsicc. *401*. 1882; Bot. Notiser **1882**: 54. 1882.

Oedogonium ochroleucum Kütz.; Rab. Alg. Eur. *1280*. 1862.

Dioecious, macrandrous; oogonium 1, subglobose, pore median; oospore globose (or subglobose), quite filling oogonium; spore-wall smooth; antheridia 1–5; sperms 2, division horizontal; vegetative cell 9–16 by 30–130 μ; oogonium 30–38 by 33–42 μ; oospore (26–) 28–35 by 28–35 μ; antheridium 12–14 by 8–11 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Illinois, Alabama, Mississippi; British Columbia.
PLATE 8. *f. 95, 96*.

9. **Oedogonium Magnusii** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 38. 1874.

Dioecious, macrandrous (perhaps sometimes monoecious); oogonia 1–3, depressed-globose, pore median, rimiform; oospore depressed-globose, quite filling oogonium; spore-wall of three layers, the outer smooth, the middle scrobiculate, the inner smooth; antheridia to 8-seriate;

sperm 1; vegetative cell 7–10 by 12–40 μ; oogonium 24–27 by 21–26 μ; oospore 22–25 by 18–23 μ; antheridium 8–10 by 5–11 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Michigan, Illinois; British Columbia.
PLATE 8. *f. 86*.

10. **Oedogonium cymatosporum** Wittr. & Nordst.; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 121. 1870.

Oedogonium Magnusii Hirn, Acta Soc. Faun. Fl. Fenn. **11**[6]: 21. 1895. Not *O. Magnusii* Wittr. 1874.

Monoecious; oogonium 1 or rarely 2, subdepressed-globose, pore median, rimiform; oospore depressed-globose, filling or not filling oogonium; spore-wall of three layers, the outer smooth, the middle scrobiculate, the inner smooth; antheridia 1–4, subepigynous, subhypogynous, hypogynous, or scattered; sperm 1; vegetative cell 6–11 by 32–70 μ; oogonium 30–40 by 27–40 μ; oospore 27–35 by 22–33 μ; antheridium 7–10 by 9–15 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Mississippi.
PLATE 8. *f. 85*.

11. **Oedogonium suecicum** Wittr. Bot. Notiser **1872**: 6. 1872.

Dioecious, macrandrous; oogonium 1, subglobose, pore median; oospore globose, nearly filling oogonium; outer spore-wall echinate, inner smooth; antheridia 2–6; sperm 1; basal cell elongate; terminal cell apically obtuse; vegetative cell 9–14 by 30–90 μ; oogonium 32–38 by 34–41 μ; oospore 30–37 by 30–37 μ; antheridium 10–12 by 13–17 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Maine, Massachusetts, Indiana, Michigan, Illinois, North Carolina, Alabama, Wyoming; British Columbia.
PLATE 8. *f. 93*.

12. **Oedogonium australe** (G. West) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium suecicum f. *australe* G. West, Jour. Linn. Soc. **39**: 45. 1909.
Oedogonium suecicum var. *australe* B. H. Smith, Proc. Ind. Acad. **41**: 193. 1932.

Dioecious, macrandrous; oogonium 1, subglobose to nearly globose, pore median; oospore globose, nearly filling oogonium; outer wall shortly and sparsely echinate, inner wall smooth; antheridia 1–2; vegetative cell 14–16 by 56–80 μ; oogonium 40–42 by 40–42 μ; oospore (without spines) 31–33 by 31–33 μ; antheridium 14–15 by 15–16 μ.

TYPE LOCALITY: Australia.
DISTRIBUTION: Indiana, North Carolina, Oklahoma.
PLATE 8. *f. 94*.

13. **Oedogonium areoliferum** (Jao) Tiffany, sp. nov.

Oedogonium cymatosporum var. *areoliferum* Jao, Rhodora **36**: 203. 1934.

Monoecious; oogonium solitary, depressed-globose, pore median, rimiform; oospore similar in form to the oogonium and filling it; spore-wall of three layers, the outer and inner smooth, the middle areolate; antheridia 4–7, subepigynous, subhypogynous, or scattered; sperm single; terminal cell obtuse; vegetative cell 6–10 by 25–64 μ; oogonium 28–32 by 25–41 μ; oospore 25–29 by 19–27 μ; antheridium 6–10 by 6–10 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 8. *f. 88*; 36. *f. 558*.

14. **Oedogonium santurcense** Tiff. Brittonia **2**: 168. 1936.

Dioecious, macrandrous; oogonium single, globose or broadly ellipsoid, pore supramedian or superior; oospore of the same form as the oogonium and filling it or not; outer spore-wall echinate; antheridium single; vegetative cell 6–9 (–16) by 20–70 μ; suffultory cell 8–16 by 35–55 μ; oogonium 25–30 by 32–42 μ; oospore 22–26 by 22–30 μ; antheridium 6–8 by 7–10 μ; basal cell 7–10 by 30–40 μ.

TYPE LOCALITY: Santurce, Puerto Rico.
DISTRIBUTION: Puerto Rico.
PLATE 8. *f. 91, 92.*

15. **Oedogonium moniliforme** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 40. 1874; Tiff. Trans. Am. Micr. Soc. **55**: 5, char. emend. 1936.

Dioecious, macrandrous; oogonia 1–5, pyriform to globose-ovoid, pore supramedian (sometimes nearly superior); oospore globose or subdepressed-globose, not filling the oogonium, at least longitudinally; middle layer of spore-wall scrobiculate; antheridia 1–5; terminal cell apically obtuse; vegetative cell 9–13 by 30–72 μ; oogonium 23–33 by 28–42 μ; oospore 22–32 by 22–32 μ; antheridium 10–12 by 8–13 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Michigan.
PLATE 8. *f. 87.*

16. **Oedogonium obsoletum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 9. 1874.

Oedogonium vernale Wittr. Bot. Notiser **1872**: 1. 1872. Not *O. vernale* Hassall. 1843.

Monoecious; oogonium 1, subglobose or subdepressed-globose, pore a little above median; oospore subdepressed-globose, not filling oogonium; spore-wall smooth; antheridia 1–3, subepigynous; sperm 1; vegetative cell 9–15 by 30–75 μ; oogonium 34–39 by 34–43 μ; oospore 30–34 by 28–32 μ; antheridium 8–9 by 12–16 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Pennsylvania.
PLATE 9. *f. 117.*

17. **Oedogonium plusiosporum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 11. 1874.

Monoecious; oogonium 1, subglobose or subellipsoid-globose, with pore a little above median; oospore globose, rarely subglobose, not quite filling oogonium; spore-wall smooth; antheridia to 6-seriate; sperm 1 (?); terminal cell obtuse; vegetative cell 12–19 by 24–77 μ; oogonium (28–) 34–45 by 35–50 μ; oospore (25–) 30–39 by 30–39 μ; antheridium 12–14 by 8–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New Jersey, Pennsylvania, Wisconsin, Wyoming, California; British Columbia.
PLATE 8. *f. 97, 98.*

18. **Oedogonium varians** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 11. 1874.

Oedogonium polymorphum Wolle, Fresh-w. Algae U. S. 73. 1887.

Monoecious (or sometimes dioecious); oogonium 1, or rarely more, depressed- or subdepressed-pyriform-globose, pore supramedian or nearly superior; oospore globose, not filling oogonium; spore-wall smooth; antheridia to 9-seriate, scattered; sperms 2, division horizontal; basal cell elongate; terminal cell apically obtuse; vegetative cell 12–16 by 35–144 μ; oogonium 34–50 by 34–55 μ; oospore 31–41 by 30–41 μ; antheridium 11–15 by 5–7 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New Jersey, Ohio, Indiana, Michigan, Illinois. Iowa.
PLATE 9. *f. 114.*

19. **Oedogonium tyrolicum** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 12. 1874.

Monoecious; oogonium 1 (rarely 2), ellipsoid-globose or occasionally obovoid, pore supramedian, rarely superior; oospore usually globose, not filling oogonium; spore-wall smooth; antheridia 1–4; sperms 2, division horizontal; basal cell elongate; terminal cell apically obtuse; vegetative cell 15–24 by 45–120 μ; oogonium 45–53 by 57–70 μ; oospore 40–48 by 40–48 μ; antheridium 12–21 by 9–11 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: Massachusetts, Iowa; Quebec.
PLATE 9. *f. 116*.

20. **Oedogonium cardiacum** (Hassall) Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 135. 1870.

Vesiculifera cardiaca Hassall, Hist. Brit. Fresh-w. Algae **1**: 203. 1845.
? *Pringsheimia inaequalis* H. C. Wood, Fresh-w. Algae N. Am. 195. 1873.
Oedogonium lautumniarum Hirn, Oefv. Finska Vet.-Soc. Förh. **38**: 20. 1896. Not *O. lautumniarum* Wittr. 1877.

Dioecious, macrandrous; oogonium usually 1, subglobose to subcordiform-globose, with a supramedian pore; oospore globose, not filling the oogonium; spore-wall smooth; antheridia 1–10; sperms 2, division horizontal; basal cell elongate; terminal cell apically obtuse; female vegetative cell 18–30 by 60–200 μ, male 15–25 by 45–170 μ; oogonium 48–70 by 58–78 μ; oospore 42–60 by 42–60 μ; antheridium 15–21 by 10–14 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Connecticut, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Oklahoma, Washington, Oregon; Ontario; Puerto Rico.
PLATE 9. *f. 108*.

20*a*. **Oedogonium cardiacum** var. **carbonicum** Wittr.; Wittr. & Nordst. Algae Exsicc. *504: 3*. 1883; Bot. Notiser **1883**: 148. 1883. *Oedogonium carbonicum* Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 33. 1874. Oogonia 1 or 2, obovoid to globose-ovoid, pore nearly superior; oospore obovoid-ellipsoid to globose-ellipsoid; female vegetative cell 14–30 by 40–200 μ, male 14–25 by 40–150 μ; oogonium 42–56 by 50–80 μ; oospore 40–52 by 46–65 μ; antheridium 13–20 by 12–15 μ. TYPE LOCALITY: Britain and Denmark. DISTRIBUTION: Ohio, Illinois, Iowa, Oklahoma. PLATE 9. *f. 121*.

21. **Oedogonium Franklinianum** Wittr.; Wittr. & Nordst. Algae Exsicc. *309*. 1880; Bot. Notiser **1880**: 116. 1880.

Dioecious, macrandrous; oogonium 1, subglobose, with a supramedian to nearly superior pore; oospore globose, almost filling oogonium; spore-wall smooth; antheridia 1–4; sperms 2, division horizontal; female vegetative cell 8–12 by 30–95 μ, male 8–10 by 25–90 μ; oogonium 26–31 by 29–41 μ; oospore 24–30 by 24–30 μ; antheridium 8–9 by 5–7 μ.

TYPE LOCALITY: New Jersey.
DISTRIBUTION: New Jersey, Pennsylvania, Illinois, Iowa, Florida; British Columbia.
PLATE 8. *f. 84*.

22. **Oedogonium Lemmermannii** Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium cardiacum var. *minus* Lemmerm. Arch. Hydrobiol. **4**: 191. 1909.

Dioecious, macrandrous; oogonium usually 1, subglobose, pore supramedian; oospore globose, not filling oogonium; spore-wall smooth; antheridia 1–6; sperms 2, division horizontal; female vegetative cell 16–28 by 25–75 μ, male 14–23 by 25–75 μ; oogonium 30–45 (–50) by 35–59 μ; oospore 28–43 by 28–42 μ; antheridium 12–15 by 5–6 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Kentucky, Iowa, Oklahoma; Puerto Rico.
PLATE 9. *f. 113*.

23. **Oedogonium glabrum** Hallas, Bot. Tidssk. **26**: 408. 1905.

Dioecious, macrandrous; oogonium 1 (rarely 2), obovoid, pore superior; oospore globose or subglobose, not filling oogonium; spore-wall smooth; antheridia 5–8; sperms 2, division vertical;

terminal cell (sometimes the oogonium) broadly apiculate; female vegetative cell 16–26 by 120–240 μ, male 21–25 by 60–150 μ; oogonium 56–58 by 63–86 μ; oospore 42–49 by 44–63 μ; antheridium 20–22 by 7–9 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Florida.
PLATE 9. *f. 111, 112.*

24. **Oedogonium lautumniarum** Wittr.; Wittr. & Nordst. Algae Exsicc. *7*. 1877; Bot. Notiser **1877**: 24. 1877.

Dioecious, macrandrous; oogonium 1, rarely 2, subobovoid-globose, pore a little above median (rarely nearly superior); oospore subglobose, or sometimes subangular, filling oogonium; spore-wall smooth, rarely thickened; antheridia 1–4; female vegetative cell 16–22 by 40–110 μ, male 15–20 by 45–100 μ; oogonium 40–49 by 45–51 μ; oospore 36–46 by 35–47 μ; antheridium 14–17 by 7–10 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan, Kentucky; British Columbia.
PLATE 9. *f. 118.*

25. **Oedogonium Hirnii** Gutw. Rozp. Akad. Umiej. II. **13**: 34. 1898.

Monoecious; oogonium 1, subglobose or subobovoid, with superior pore; oospore globose, not filling oogonium; spore-wall smooth; antheridia 1 or 2, subepigynous; sperms 2, division horizontal; vegetative cell (sometimes slightly capitellate) 8–13 by 28–80 μ; oogonium 32–37 by 32–39 μ; oospore 28–31 by 28–31 μ; antheridium 8–11 by 4–9 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: Indiana, Iowa, Kentucky.
PLATE 9. *f. 109.*

26. **Oedogonium globosum** Nordst. Minneskr. Fys. Sällsk. Lund **7**: 20. 1878.

Monoecious; oogonium 1, globose or subglobose, pore superior; oospore globose, quite filling oogonium; spore-wall smooth; antheridia 1–7, subepigynous or subhypogynous or scattered; sperms 2, division horizontal; basal cell elongate; terminal cell setiform; vegetative cell 10–14 by 40–95 μ; oogonium 32–40 by 32–46 μ; oospore 30–37 by 28–37 μ; antheridium 9–12 by 4–8 μ.

TYPE LOCALITY: Hawaii.
DISTRIBUTION: Massachusetts, Michigan, Indiana, Illinois, Iowa.
PLATE 9. *f. 120.*

27. **Oedogonium intermedium** Wittr.; Wittr. & Nordst. Algae Exsicc. *708*. 1886; Bot. Notiser **1886**: 134. 1886; Hirn, Acta Soc. Sci. Fenn. **27**: 94. 1900.

Oedogonium Vaucherii Wittr. & Nordst. Algae Exsicc. *14*. 1877. Not *O. Vaucherii* A. Br. 1855.
Oedogonium fragile Wittr.; Wittr. & Nordst. Algae Exsicc. *402*. 1882. Not *O. fragile* Wittr. 1870.

Monoecious; oogonium 1, obovoid to obovoid-globose, pore superior; oospore globose or obovoid-globose, filling oogonium or nearly so; spore-wall smooth and thick; antheridia 1–4, epigynous or subepigynous or hypogynous or rarely scattered; sperms 2, division horizontal; vegetative cell 15–18 by 45–80 μ; oogonium 31–37 by 34–45 μ; oospore 30–36 by 33–41 μ; antheridium 14–16 by 5–10 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Maine, Massachusetts, Ohio, Illinois, Iowa, Alabama, Mississippi, Kentucky, Missouri, Oklahoma; Puerto Rico.
PLATE 9. *f. 119.*

28. **Oedogonium fragile** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 120. 1870.

Oedogonium Candollei Bréb.; Mong. & Roum. Alg. Fr. *347*. 1884.

Monoecious; oogonium 1, globose or subobovoid-globose, with superior pore; oospore globose, filling oogonium; spore-wall smooth; antheridia 1–3; sperms 2, division horizontal; basal cell elongate; vegetative cell 12–17 by 50–120 μ; oogonium 42–50 by 44–55 μ; oospore 39–46 by 39–46 μ; antheridium 12–15 by 10–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Pennsylvania, Ohio, Michigan, Illinois, Iowa, North Carolina, Mississippi, Wyoming; British Columbia.
PLATE 10. *f. 132*.

29. **Oedogonium fennicum** (Tiff.) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium intermedium "forma valida" Hirn, Acta Soc. Sci. Fenn. **27**: 95. 1900.
Oedogonium intermedium var. *fennicum* Tiff. Ohio Jour. Sci. **29**: 74. 1929.

Monoecious; oogonium 1, obovoid to obovoid-globose, pore superior; oospore globose or obovoid-globose, nearly filling oogonium; spore-wall smooth; antheridia 1–4, subepigynous or hypogynous or rarely scattered; sperms 2, division horizontal; vegetative cell 17–19 by 50–120 μ; oogonium 38–46 by 42–60 μ; oospore 35–40 by 35–40 μ; antheridium 13–18 by 6–8 μ.

TYPE LOCALITY: Finland.
DISTRIBUTION: Michigan, Alabama.
PLATE 10. *f. 131*.

30. **Oedogonium Vaucherii** A. Br. Abh. Akad. Berlin **1855**: 40. 1855; Wittr. Oefv. Sv. Vet.-Akad. **27**: 121. 1870.

? *Prolifera Vaucherii* Le Clerc, Mém. Mus. Paris **3**: 474. 1817.
? *Oedogonium diandronites* Carter, Ann. Mag. Nat. Hist. III. **1**: 31. 1858.
? *Oedogonium monandronites* Carter, Ann. Mag. Nat. Hist. III. **1**: 38. 1858.
Oedogonium Vaucherii f. *insulare* Hirn, Acta Soc. Sci. Fenn. **27**: 99. 1900.

Monoecious; oogonium 1, usually ovoid, pore superior; oospore globose to subglobose, not filling oogonium; spore-wall smooth and sometimes thick; antheridia 1–4; sperms 2, division horizontal; basal cell elongate; vegetative cell 20–30 by 32–118 μ; oogonium 40–58 by 45–65 μ; oospore 35–54 by 35–55 μ; antheridium 17–30 by 6–15 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Ohio, Indiana, Michigan, Illinois, Iowa, Mississippi.
PLATE 10. *f. 124, 125*.

31. **Oedogonium pseudo-Boscii** Hirn, Acta Soc. Faun. Fl. Fenn. 11^6: 21. 1895.

Oedogonium neglectum Hirn, Acta Soc. Faun. Fl. Fenn. 11^6: *f. 5*. 1895.

Monoecious; oogonium 1, subobovoid, pore superior; oospore ellipsoid-ovoid or ellipsoid, inflating lower part of oogonium, otherwise not filling it; spore-wall smooth; antheridia 1 or 2, subepigynous; sperms 2, division horizontal; vegetative cell 8–14 by 64–275 μ; oogonium 41–50 by 75–105 μ; oospore 38–45 by 48–60 μ; antheridium 11–12 by 10–11 μ.

TYPE LOCALITY: Finland.
DISTRIBUTION: Massachusetts, Illinois, Alabama.
PLATE 10. *f. 130*.

32. **Oedogonium Sodiroanum** Lagerh. Anal. Univ. Ecuador 4^{27}: 81. 1890; Tiff. Oedog. Monog. 77. 1930.

Monoecious; oogonium 1, ellipsoid-obovoid, pore superior; oospore ellipsoid, not filling oogonium at upper end; spore-wall smooth; antheridia subhypogynous or subepigynous or

scattered, 1–9; sperms 2, division vertical; vegetative cell 20–24 by 44–84 μ; oogonium 40–45 by 70–90 μ; oospore 38–42 by 56–64 μ; antheridium 20–22 by 6–8 μ.

TYPE LOCALITY: Ecuador.
DISTRIBUTION: Michigan, Indiana.
PLATE 10. *f. 122, 123.*

33. **Oedogonium Richterianum** Lemmerm. Forsch. Biol. Sta. Plön 3: 26. 1895.

Oedogonium paludosum Kütz.; Hirn, Acta Soc. Faun. Fl. Fenn. 11[6]: 14. 1895. Not *O. paludosum* Wittr. 1870.

Monoecious; oogonia 1 or 2, obovoid or subellipsoid, pore superior; oospore subobovoid or subellipsoid (rarely globose-ellipsoid), filling oogonium or not; spore-wall smooth; antheridia 1–6, subhypogynous or subepigynous or scattered; sperms 2, division horizontal; basal cell elongate; vegetative cell 12–21 by 36–126 μ; oogonium 36–48 by 48–74 μ; oospore 35–43 by 43–59 μ; antheridium 12–15 by 6–10 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Michigan, Indiana; British Columbia.
PLATE 10. *f. 128, 129.*

34. **Oedogonium upsaliense** Wittr. Oefv. Sv. Vet.-Akad. Förh. 27: 125. 1870.

Oedogonium tumidulum Aresch. Algae Scand. Exs. II. *236.* 1864. Not *O. tumidulum* Pringsh. 1857.

Monoecious; oogonium 1, obovoid or suboblong-ellipsoid, pore superior; oospore same form as and filling oogonium; spore-wall smooth; antheridia 1–3, subhypogynous; antheridium, oogonium, and vegetative cell alternating; sperms 2, division vertical; vegetative cell varying much in same filament; suffultory cell up to 27 μ in diameter; basal cell elongate; terminal cell obtuse; vegetative cell 13–20 by 55–160 μ; oogonium 45–50 by 66–100 μ; oospore 42–47 by 60–75 μ; antheridium 15–18 by 7–10 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New Hampshire, Ohio, Michigan, Illinois; Greenland.
PLATE 10. *f. 133.*

35. **Oedogonium oviforme** (Lewin) Hirn, Acta Soc. Sci. Fenn. 27: 116. 1900.

Oedogonium urbicum var. *oviforme* Lewin, Bih. Sv. Vet.-Akad. Handl. 14[1]: 17. 1888.

Monoecious; oogonium 1, obovoid to ellipsoid-obovoid, pore superior; oospore obovoid to ovoid (rarely almost globose), filling or not filling the oogonium; spore-wall smooth, thick; antheridia 1–4, epigynous, hypogynous, or scattered; sperms 2, division vertical; basal cell elongate; vegetative cell 15–23 by 40–135 μ; oogonium 48–55 by (56–) 65–80 μ; oospore 46–53 by 50–63 μ; antheridium 16–19 by 7–12 μ.

TYPE LOCALITY: Spain.
DISTRIBUTION: Iowa.
PLATE 10. *f. 137.*

36. **Oedogonium martinicense** Hirn, Acta Soc. Sci. Fenn. 27: 134. 1900.

Oedogonium crassum Wolle, Fresh-w. Alg. U. S. 74. 1887. Not *O. crassum* Wittr. 1872.

Monoecious; oogonium 1, obovoid or subobovoid, pore superior; oospore obovoid or obovoid-ellipsoid, quite filling oogonium; spore-wall smooth, often thick; antheridia 1–5, hypogynous; sperms 2, division vertical; vegetative cell 33–37 by 115–240 μ; oogonium (63–) 68–74 by 96–125 μ; oospore 66–72 by 81–96 μ; antheridium 33–35 by 5–7 μ.

TYPE LOCALITY: Martinique.
DISTRIBUTION: Iowa, Missouri, Kansas; Martinique.
PLATE 12. *f. 164.*

37. **Oedogonium geniculatum** Hirn, Erythea **6**: 21. 1898.

Monoecious; oogonium 1, obovoid or obovoid-globose, pore superior; oospore globose or subdepressed-globose, not filling oogonium; spore-wall smooth and thick; antheridia 1–5, subepigynous or subhypogynous or scattered, sometimes alternating with vegetative cell; sperms 2 (?), division (?) horizontal; vegetative cell 37–48 by 60–135 μ; oogonium 56–63 by 56–68 μ; oospore 48–59 by 48–59 μ; antheridium 37–44 by 5–9 μ.

TYPE LOCALITY: Berkeley, California.
DISTRIBUTION: Ohio, California.
PLATE 11. *f. 138*.

38. **Oedogonium Kurzii** G. Zeller, Jour. Asiatic Soc. Bengal **42**[2]: 189. 1873; Hedwigia **12**: 189. 1873.

Monoecious; oogonium 1, rarely in series, obovoid or subellipsoid, pore superior; oospore subglobose or ellipsoid, not filling oogonium; spore-wall smooth; antheridia hypogynous or scattered, to 15-seriate; sperms 2, division vertical; terminal cell apically obtuse; vegetative cell 44–52 by 90–250 μ; oogonium 70–95 by 111–130 μ; oospore 67–86 by 80–93 μ; antheridium 44–52 by 6–16 μ.

TYPE LOCALITY: India.
DISTRIBUTION: Pennsylvania, Indiana, North Carolina, Florida, Mississippi, Arkansas; Puerto Rico.
PLATE 12. *f. 165*.

39. **Oedogonium lageniforme** Hirn, Acta Soc. Sci. Fenn. **27**: 291. 1900; Tiff. Brittonia **2**: 168. 1936.

Dioecious, macrandrous; oogonium single, obpyriform (in optical section longitudinally trinodulose to undulate), with superior pore (sometimes nearly supreme); oospore globose to ellipsoid, occupying the lower inflated part of the oogonium or nearly filling it; spore-wall smooth; antheridium with single (?) sperm; vegetative cell 11–14 by 35–90 μ; oogonium 30–36 by 42–63 μ; oospore 28–31 by 31–40 μ; antheridium 11–12 by 10–13 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Alabama; Puerto Rico.
PLATE 10. *f. 134–136*.

40. **Oedogonium anomalum** Hirn, Acta Soc. Sci. Fenn. **27**: 112. 1900.

Oedogonium stagnale var. *variabile* Lewin, Bih. Sv. Vet.-Akad. Handl. **14**[1]: 17. 1888.

Dioecious, macrandrous; oogonium 1, subovoid or cylindric-ovoid, pore superior; oospore globose or subglobose, not filling oogonium, spore-wall smooth; antheridia 4–13; sperms 2, division vertical; terminal cell apically obtuse; female vegetative cell 40–50 by 80–300 μ, male 33–42 by 80–240 μ; oogonium 54–64 by 68–75 μ; oospore 48–60 by 52–61 μ; antheridium 30–40 by 6–18 μ.

TYPE LOCALITY: Spain.
DISTRIBUTION: Iowa.
PLATE 12. *f. 154–156*.

41. **Oedogonium capillare** (L.) Kütz. Phyc. Gen. 255. 1843; Tab. Phyc. **3**: 13. 1853.

Conferva capillaris L. Sp. Pl. 1166. 1753.
Oedogonium capillare var. *flavescens* Rab. Alg. Eur. *1470*. 1863.
Oedogonium stagnale Wittr. & Nordst. Algae Exsicc. *504*. 1883. Not *O. stagnale* Kütz. 1849.

Dioecious, macrandrous; oogonium 1, not or scarcely exceeding the vegetative cell in diameter, cylindric to subcylindric, pore superior; oospore globose to cylindric-globose to ovoid, not or completely filling oogonium; spore-wall smooth; antheridia 1–4, often alternating with vegetative cell; sperms 2, division horizontal; basal cell elongate, terminal cell broadly

apiculate to obtuse; female vegetative cell 35–56 by 36–120 μ, male 35–50 by 35–90 μ; oogonium 40–60 by 45–75 μ; oospore 30–52 by 35-65 μ; antheridium 30–48 by 5–10 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Ohio, Michigan, Indiana, Iowa, Florida.
PLATE 11. *f. 151, 152.*

41*a*. **Oedogonium capillare** f. **stagnale** (Kütz.) Hirn, Acta Soc. Sci. Fenn. **27**: 113. 1900. *Oedogonium stagnale* Kütz. Sp. Alg. 368. 1849. Oospore subcylindric or cylindric-globose, sometimes constricted at the middle, not filling oogonium; female vegetative cell 38–50 by 40–100 μ; male 35–45 by 36–90 μ; oogonium 40–60 by 55–75 μ; oospore 36–57 by 40–60 μ; antheridium 33–42 by 5–9 μ. TYPE LOCALITY: Germany. DISTRIBUTION: Ohio. PLATE 11. *f. 153.*

42. **Oedogonium gracilius** (Wittr.) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium plagiostomum var. *gracilius* Wittr. Bot. Notiser **1878**: 142. 1878.

Dioecious, macrandrous; oogonium 1, obovoid-globose, pore superior; oospore globose to subglobose, nearly filling oogonium; spore-wall smooth; basal cell elongate; vegetative cell 20–25 by 40–100 μ; oogonium 36–42 by 46–57 μ; oospore 34–39 by 36–44 μ; antheridium 19–22 by 7–10 μ.

TYPE LOCALITY: Orizaba, Vera Cruz.
DISTRIBUTION: New York, Ohio, Indiana, Illinois, Iowa, North Carolina, Florida, Alabama, Mississippi, Kentucky, Oklahoma; Puerto Rico; Mexico.
PLATE 11. *f. 143, 144.*

43. **Oedogonium plagiostomum** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 41. 1874.

Oedogonium sp. Wittr. Bih. Sv. Vet.-Akad. Handl. 1^1: 24. 1872.

Dioecious, macrandrous; oogonium 1, obovoid-globose, with superior pore; oospore globose to subglobose, usually filling oogonium; spore-wall smooth and thick; antheridia 1–6, often alternating with vegetative cell; basal cell elongate; vegetative cell 22–27 by 65–120 μ; oogonium 42–49 by 50–60 μ; oospore 41–47 by 42–49 μ; antheridium 20–24 by 8–10 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Ohio, Indiana, Illinois, Iowa, North Carolina, Florida, Mississippi.
PLATE 11. *f. 141, 142.*

44. **Oedogonium princeps** (Hassall) Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 42. 1874; Wu & Tilden, New Phytol. **29**: 141. 1930.

Vesiculifera princeps Hassall, Ann. Mag. Nat. Hist. **10**: 388. 1843.
Vesiculifera capillaris Hassall, Hist. Brit. Fresh-w. Algae **1**: 195. 1845.

Dioecious, macrandrous; oogonium 1, little tumid, subobovoid, pore superior; oospore globose or subglobose, not filling oogonium; spore-wall smooth; terminal cell apiculate; antheridia 1–7; sperms 2, division vertical; vegetative cell 33–43 by 40–155 μ; oogonium 51–63 by 54–80 μ; oospore 47–58 by 47–65 μ; antheridium 32–38 by 5–20 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Ohio, Indiana, Michigan, Minnesota, Mississippi, Oklahoma, California.
PLATE 11. *f. 147–150.*

45. **Oedogonium biforme** Nordst.; Wittr. & Nordst. Algae Exsicc. *307*. 1880; Bot. Notiser **1880**: 116. 1880.

Dioecious, macrandrous; oogonium 1 (rarely 2), pore superior, cylindric-obovoid to subobovoid; oospore oblong-ellipsoid to subglobose or nearly globose, generally not filling oogonium; spore-wall smooth; antheridia to 21-seriate; sperms 2, division vertical; female vegetative cell 22–32 by 55–140 μ, male 18–28 by 45–140 μ; oogonium 37–52 by 48–90 μ; oospore 36–48 by 40–70 μ; antheridium 18–28 by 6–15 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Indiana.
PLATE 10, *f. 126, 127.*

46. **Oedogonium capilliforme** Kütz. Tab. Phyc. **3**: 12. 1853; Wittr. Bih. Sv. Vet.-Akad. Handl. **1**[1]: 21. 1872.

Oedogonium dioicum Petrovsky, Bull. Soc. Nat. Mosc. **34**[1]: 611. 1861.

Dioecious, macrandrous; oogonium 1, obovoid to subovoid, with superior pore; oospore ovoid-globose, cylindric-globose, subglobose, or globose, not filling oogonium; spore-wall smooth; antheridia 2–8, often alternating with the vegetative cell; sperms 2, division horizontal; basal cell elongate, terminal cell apically obtuse or apiculate; female vegetative cell 28–38 by 42–120 μ, male 25–30 by 40–100 μ; oogonium 42–50 by 51–62 μ; oospore 37–45 by 40–50 μ; antheridium 20–25 by 8–10 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Ohio, Michigan, Indiana, Illinois, Iowa, Florida, Mississippi, Missouri, Utah; Puerto Rico.
PLATE 12. *f. 157, 158.*

46*a*. **Oedogonium capilliforme** f. **Debaryanum** (Chmiel.) Hirn, Acta Soc. Sci. Fenn. **27**: 108. 1900. *Oedogonium Debaryanum* Chmiel. Trudy Obshch. Ispyt. Prir. Khark. **23**: 167. 1890. Oospore globose or subglobose; female vegetative cell 25–37 by 38–130 μ, male 22–27 by 35–100 μ; oogonium 46–56 by 52–66 μ; oospore 38–50 by 40–53 μ; antheridium 18–24 by 5–10 μ. TYPE LOCALITY: Russia. DISTRIBUTION: Iowa; Greenland. PLATE 12. *f. 159, 160*

46*b*. **Oedogonium capilliforme** var. **australe** Wittr.; Wittr. & Nordst. Algae Exsicc. *704*. 1886; Bot. Notiser **1886**: 133. 1886. *Oedogonium princeps* Tilden, Am. Algae *4*. 1894. Not *O. princeps* Wittr. 1874. *Oedogonium capilliforme* var. *australe* f. *uberosporum* Hirn, Acta Soc. Sci. Fenn. **27**: 110. 1900. Oogonium obovoid-globose to subglobose; female vegetative cell 24–36 by 26–100 μ, male 22–33 by 40–100 μ; oogonium 37–53 by 43–60 μ; oospore 35–50 by 36–55 μ; antheridium 21–26 by 4–9 μ. TYPE LOCALITY: Uruguay. DISTRIBUTION: New York, Indiana, Iowa, Minnesota, South Dakota, Nebraska, California; British Columbia; Mexico. PLATE 12. *f. 161–163.*

47. **Oedogonium diversum** (Hirn) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium stagnale Tilden, Am. Algae *122*. 1896. Not *O. stagnale* Kütz. 1849.
Oedogonium capilliforme var. *australe* f. *diversum* Hirn, Acta Soc. Sci. Fenn. **27**: 110. 1900.
Oedogonium capilliforme var. *diversum* Tiff. Ohio Jour. Sci. **29**: 75. 1929.

Dioecious, macrandrous; oogonium 1, obovoid to subovoid, with superior pore; oospore ovoid-globose, subglobose, or globose, not filling oogonium; spore-wall smooth; antheridia 2–5; sperms 2, division horizontal; female vegetative cell 34–46 by 45–130 μ, male 33–40 by 50–120 μ; oogonium 46–56 by 46–70 μ; oospore 43–52 by 40–58 μ; antheridium 30–37 by 6–11 μ.

TYPE LOCALITY: Fort Collins, Colorado.
DISTRIBUTION: Indiana, Iowa, Minnesota, Colorado, Montana.
PLATE 12. *f. 166, 167.*

48. **Oedogonium rivulare** A. Br. Abh. Akad. Berlin **1855**: 23. 1855.

? *Prolifera rivularis* Le Clerc, Mém. Mus. Paris **3**: 472. 1817.

Dioecious, macrandrous; oogonia 1–7, obovoid, pore superior; oospore obovoid, ellipsoid, or subglobose, not filling oogonium longitudinally; spore-wall smooth; antheridia to 13-seriate; sperms 2, division horizontal; basal cell elongate; female vegetative cell 35–45 by 110–350 μ, male 30–36 by 120–280 μ; oogonium 70–85 by 130–160 μ; oospore 55–70 by 65–100 μ; antheridium 21–28 by 14–26 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Indiana, Iowa, Florida.
PLATE 11. *f. 139, 140.*

49. **Oedogonium pachyandrium** Wittr.; Wittr. & Nordst. Algae Exsicc. *5*. 1877; Bot. Notiser **1877**: 24. 1877.

Dioecious, macrandrous; oogonia 1–3, subobovoid or obovoid-ellipsoid, pore superior; oospore ellipsoid, not filling oogonium (rarely inflating it); spore-wall smooth; antheridia 1–4;

sperms 2, division vertical; female vegetative cell 30–36 by 80–220 μ, male 32–45 by 60–160 μ; oogonium 53–57 by 84–108 μ; oospore 51–54 by 69–85 μ, antheridium 30–43 by 11–20 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, New Jersey, Pennsylvania, Kentucky.
PLATE 13. *f. 179–181.*

50. **Oedogonium mexicanum** Wittr. Bot. Notiser **1878**: 138. 1878.

Dioecious, macrandrous; oogonium 1, cylindric-obovoid, pore superior; oospore cylindric-obovoid, quite or nearly filling oogonium; spore-wall smooth; antheridia to 8-seriate; sperms 2, division vertical; female vegetative cell 34–41 by 60–140 μ, male 30–38 by 60–114 μ; oogonium 53–63 by 76–110 μ; oospore 51–60 by 63–80 μ; antheridium 28–35 by 7–17 μ.

TYPE LOCALITY: Orizaba, Vera Cruz.
DISTRIBUTION: Massachusetts, Michigan, Indiana, South Dakota, North Carolina, Oklahoma; Mexico.
PLATE 11. *f. 145, 146.*

51. **Oedogonium grande** Kütz. Phyc. Germ. 200. 1845.

Dioecious, macrandrous; oogonia 1–5, subobovoid, pore superior; oospore of the same form as oogonium, which it completely fills or not; spore-wall smooth; antheridia 1–10; sperms 2, division vertical; basal cell elongate; female vegetative cell 28–37 by 70–210 μ, male 28–33 by 70–175 μ; oogonium 49–60 by 86–110 μ; oospore 47–58 by 60–94 μ; antheridium 25–33 by 11–18 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Maine, Massachusetts, Connecticut, Pennsylvania, Ohio, Indiana, Michigan, Illinois, Minnesota, Mississippi, Oklahoma, Utah, California; Ontario; Puerto Rico.
PLATE 13. *f. 172–174.*

51*a*. **Oedogonium grande** var. **aequatoriale** Wittr.; Wittr. & Nordst. Algae Exsicc. *1016*. 1893; Bot. Notiser **1893**: 192. 1893. *Oedogonium grande* var. *aequatoriale* f. *hortense* Wittr.; Hirn, Acta Soc. Sci. Fenn. **27**: 145. 1900. Not *O. grande* f. *hortense* Wittr. 1893. Male vegetative cell 22–28, female 26–33 by 70–165 μ; oogonium 44–51 by 75–100 μ; oospore 42–49 by 50–81 μ. TYPE LOCALITY: Ecuador. DISTRIBUTION: Greenland. PLATE 13. *f. 175.*

52. **Oedogonium majus** (Hansg.) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium grande var. *majus* Hansg. Arch. Nat. Land. Böhmen **5**[6]: 45. 1886.
Oedogonium grande f. *robustum* Hirn, Acta Soc. Sci. Fenn. **27**: 144. 1900.
Oedogonium grande var. *robustum* Tiff. Ohio Jour. Sci. **24**: 186. 1924.

Dioecious, macrandrous; oogonia 1–3, subobovoid (sometimes nearly ellipsoid), pore superior; oospore similar in shape to oogonium and usually filling it; spore-wall smooth; antheridia 1–5; sperms 2, division vertical; basal cell elongate; female vegetative cell 36–46 by 80–200 μ, male 32–42 by 80–200 μ; oogonium 52–68 by 75–90 μ; oospore 50–64 by 68–88 μ; antheridium 30–36 by 10–16 μ.

TYPE LOCALITY: Bohemia.
DISTRIBUTION: Massachusetts, Ohio, Indiana, Michigan, Illinois, Iowa, North Carolina.
PLATE 13. *f. 170, 171.*

53. **Oedogonium oboviforme** Wittr. Bot. Notiser **1878**: 140. 1878.

Dioecious, macrandrous; oogonium 1, obovoid, pore superior; oospore obovoid (rarely ellipsoid-obovoid), about filling oogonium; spore-wall smooth; antheridia to 19-seriate; sperms 2, division vertical; basal cell elongate; female vegetative cell 21–33 by 72–280 μ, male 21–31 by 72–270 μ; oogonium 55–65 by (76–) 80–107 μ; oospore 54–61 by 70–85 μ; antheridium 21–28 by 5–13 μ.

TYPE LOCALITY: Vera Cruz, Mexico.
DISTRIBUTION: Oklahoma; Mexico.
PLATE 13. *f. 168, 169.*

54. **Oedogonium angustum** (Hirn) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium grande var. *angustum* Hirn, Acta Soc. Sci. Fenn. **27**: 146. 1900.

Dioecious, macrandrous; oogonia 1–4, subobovoid, pore superior; oospore similar in shape to oogonium and nearly filling it; spore-wall smooth; antheridia to 36-seriate; sperms 2, division vertical; female vegetative cell 19–30 by 70–330 μ, male 19–25 by 80–225 μ; oogonium 42–52 by 62–110 μ; oospore 40–50 by 60–89 μ; antheridium 18–22 by 7–15 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Maine, Massachusetts, Ohio, Michigan, Illinois, Alabama, Mississippi, Oklahoma.
PLATE 13. *f. 176–178*.

55. **Oedogonium Landsboroughi** (Hassall) Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 35. 1874.

Vesiculifera Landsboroughi Hassall, Ann. Mag. Nat. Hist. **10**: 389. 1843.
Oedogonium gemelliparum Hantzsch; Rab. Alg. Eur. *1118*. 1861. Not *O. gemelliparum* Pringsh. 1858.
Oedogonium gemelliparum var. *majus* Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 137. 1870.

Dioecious, macrandrous; oogonia 1 or 2 (rarely 3), obovoid to ovoid, pore superior; oospore ovoid to ellipsoid, filling or not filling the oogonium; spore-wall smooth; antheridia up to 30-seriate; sperms two, division vertical; basal cell elongate, terminal cell obtuse; female vegetative cell 31–40 by 90–240 μ, male 30–37 by 120–225 μ; oogonium 63–78 by 85–115 μ; oospore (55–) 59–70 by 73–102 μ; antheridium 27–35 by 9–20 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Connecticut, New York, Ohio, Michigan, Indiana, Iowa, Mississippi, Oklahoma; British Columbia.
PLATE 14. *f. 186, 187*.

55*a*. **Oedogonium Landsboroughi** var. **norvegicum** Wittr.; Wittr. & Nordst. Algae Exsicc. *204*; 1879; Bot. Notiser **1879**: 23. 1879. *Oedogonium Landsboroughi* var. *robustum* Wittr.; Wittr. & Nordst. Algae Exsicc. *1215*. 1896; Bot. Notiser **1897**: 83. 1897. Vegetative cell shorter but of larger diameter, the female 38–45 by 60–160 μ, the male 36–45 by 55–135 μ; oogonium 64–73 by 70–105 μ; oospore 60–70 by 67–90 μ; antheridium 35–45 by 8–15 μ. TYPE LOCALITY: Norway. DISTRIBUTION: Iowa; Mexico. PLATE 14. *f. 188, 189*.

56. **Oedogonium crassum** (Hassall) Wittr. Bih. Sv. Vet.-Akad. Handl. **1**^{1}: 20. 1872.

Vesiculifera crassa Hassall, Ann. Mag. Nat. Hist. **10**: 389. 1843.
Oedogonium crassum var. *orbiculare* Jao, Papers Mich. Acad. **19**: 87. 1934.

Dioecious, macrandrous; oogonia 1 or 2, ovoid to obovoid-ellipsoid, pore superior; oospore variable, ellipsoid to globose, filling or not filling oogonium; spore-wall smooth; antheridia 2–25; sperms 2, division vertical; female vegetative cell 30–50 by 72–340 μ, male 24–36 by 72–260 μ; oogonium 60–80 by 75–120 μ; oospore 58–76 by 65–96 μ; antheridium 28–33 by 8–20 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Michigan, Indiana, Florida, Alabama, Mississippi, Oklahoma.
PLATE 14. *f. 184, 185*.

57. **Oedogonium amplum** Magnus & Wille; Wille, Bih. Sv. Vet.-Akad. Handl. **8**^{18}: 40. 1884.

Oedogonium crassum Wille, Bih. Sv. Vet.-Akad. Handl. **8**^{18}: 39. 1884. Not *O. crassum* Wittr. 1872.
? *Oedogonium rivulare* var. *majus* Wolle, Fresh-w. Alg. U. S. 92. 1887.
Oedogonium crassum var. *amplum* Hirn, Acta Soc. Sci. Fenn. **27**: 139. 1900.

Dioecious, macrandrous; oogonia 1 or 2, ovoid to obovoid-ellipsoid, pore superior; oospore ellipsoid to broadly ellipsoid (or nearly globose), nearly filling oogonium, its wall smooth; antheridia 2–20, division vertical; female vegetative cell 46–54 by 70–160 μ, male 42–50 by 65–200 μ; oogonium 75–90 by 83–115 μ; oospore 72–85 by 77–100 μ; antheridium 40–50 by 8–20 μ.

TYPE LOCALITY: Uruguay.
DISTRIBUTION: Ohio, Michigan, Illinois, Florida, Mississippi.
PLATE 14. *f. 182, 183*.

58. **Oedogonium longum** (Transeau) Transeau; Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium crassum var. *longum* Transeau, Techn. Publ. N. Y. Coll. Forestry 9: 237. 1918.

Dioecious, macrandrous; oogonium 1, elongate-ovoid to ellipsoid to elongate-ellipsoid, pore superior; oospore ellipsoid, not filling oogonium longitudinally, its wall smooth; antheridia 1–5; sperms 2, division vertical; female vegetative cell 40–52 by 100–240 μ, male 36–44 by 100–180 μ; oogonium 68–84 by 120–180 μ; oospore 66–80 by 100–125 μ; antheridium 34–40 by 8–14 μ.

TYPE LOCALITY: Oneida Lake, New York.
DISTRIBUTION: New York, Ohio, Indiana; Puerto Rico.
PLATE 15. *f. 192, 193.*

59. **Oedogonium subrectum** Hirn, Acta Soc. Sci. Fenn. **27**: 141. 1900.

Dioecious, macrandrous; oogonia 1 or 2, subellipsoid or obovoid-ellipsoid, pore superior; oospore ellipsoid or globose-ellipsoid, filling or nearly filling oogonium; spore-wall smooth, often thick; antheridia to 9-seriate; sperms 2, division vertical; basal cell elongate; terminal cell apically obtuse; female vegetative cell 27–35 by 160–340 μ, male 26–33 by 104–300 μ; oogonium 70–83 by 83–103 μ; oospore 65–80 by 75–93 μ; antheridium 22–28 by 8–14 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: North Carolina.
PLATE 15. *f. 194–196.*

60. **Oedogonium fabulosum** Hirn, Acta Soc. Sci. Fenn. **27**: 114. 1900.

Dioecious, macrandrous; oogonium 1, little tumid, cylindric, pore superior; oospore globose or ellipsoid, not filling oogonium in length; spore-wall smooth; antheridia seriate; sperms 2, division vertical; vegetative cell 74–85 by 115–210 μ; oogonium 81–96 by 104–133 μ; oospore 75–89 by 78–104 μ; antheridium 68–80 by 7–22 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Florida.
PLATE 14. *f. 190, 191.*

61. **Oedogonium exocostatum** Tiff. Ohio Jour. Sci. **21**: 272. 1921.

Dioecious, macrandrous; oogonia 1 or 2, ellipsoid to ellipsoid-globose, occasionally terminal, pore superior; oospore of the same form as the oogonium, which it very nearly completely fills; spore-wall of two layers, the outer marked by 13–15 longitudinal ribs, the inner smooth; suffultory cell swollen; male filament a little more slender than the female; antheridia 3–7; sperms 2, division horizontal; basal cell elongate; female vegetative cell (13–) 18–25 by 72–140 μ, male (13–) 16–20 by 48–100 μ; suffultory cell 22–30 by 60–90 μ; oogonium 40–52 by 60–96 μ; oospore 38–41 by 56–68 μ; antheridium 12–16 by 7–12 μ.

TYPE LOCALITY: Akron, Ohio.
DISTRIBUTION: Ohio, Indiana, Iowa, Oklahoma; Puerto Rico.
PLATE 15. *f. 199–203.*

62. **Oedogonium paulense** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 292. 1900; Schmidle, Hedwigia **40**: 344. 1901.

Monoecious; oogonium 1, subellipsoid or ellipsoid-ovoid, pore superior; oospore ellipsoid to broadly ellipsoid, not or quite filling oogonium; spore-wall of three layers, the outer and inner smooth, the middle with 18–22 longitudinal ribs, entire and sometimes anastomosing; antheridia 1 or 2, subepigynous; sperms 2, division horizontal; vegetative cell 10–15 by 50–120 μ; oogonium 33–38 by 43–68 μ; oospore 30–36 by 38–45 μ; antheridium 10–14 by 6–8 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Indiana; Puerto Rico.
PLATE 15. *f. 197, 198.*

63. **Oedogonium paludosum** (Hassall) Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 124. 1870.

Vesiculifera paludosa Hassall, Hist. Brit. Fresh-w. Algae 1: 199. 1845.

Monoecious; oogonium 1, ellipsoid, pore superior; oospore ellipsoid, filling oogonium; spore-wall in three layers, the outer and middle with 27–35 longitudinal ribs, continuous, rarely anastomosing, the inner layer smooth; antheridia 1–8, scattered, often in the upper part of the filament; sperms 2, division vertical; vegetative cell 15–20 by 50–140 μ; oogonium 39–48 by 66–84 μ; oospore 36–45 by 54–63 μ; antheridium 14–16 by 6–13 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Pennsylvania, Michigan, Indiana, Illinois; British Columbia.
PLATE 15. *f. 208*.

63*a*. **Oedogonium paludosum** var. **parvisporum** Hirn, Acta Soc. Sci. Fenn. **27**: 120. 1900. Oogonium subellipsoid or suboblong-ellipsoid; oospore not filling oogonium; antheridium subepigynous or subhypogynous or scattered; vegetative cell 15–20 by 45–120 μ; oogonium 38–44 by 70–86 μ; oospore 35–41 by 54–60 μ; antheridium 15–17 by 7–12 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Ohio, Michigan, Indiana, Illinois, Oklahoma. PLATE 15. *f. 209*.

64. **Oedogonium carolinianum** Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium paludosum var. *americanum* Nordst.; Hirn, Acta Soc. Sci. Fenn. **27**: 121. 1900.

Monoecious; oogonium single, ellipsoid or nearly so, pore superior; oospore ellipsoid (often broadly so), filling oogonium or nearly so; spore-wall of three layers, the outer and middle with 27–35 (40) longitudinal costae, continuous and rarely anastomosing, the inner layer smooth; antheridia 1–7, scattered; sperms 2, division vertical; vegetative cell 14–23 by 45–156 μ; oogonium 54–63 by 75–90 μ; oospore 49–57 by 69–75 μ; antheridium 12–18 by 7–12 μ.

TYPE LOCALITY: South Carolina.
DISTRIBUTION: South Carolina.
PLATE 15. *f. 210*.

65. **Oedogonium occidentale** (Hirn) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium Boscii var. *occidentale* Hirn, Acta Soc. Sci. Fenn. **27**: 125. 1900.

Dioecious, macrandrous; oogonium single, oblong-ellipsoid, pore superior; oospore ellipsoid, not nearly filling oogonium longitudinally, its wall of three layers, the outer and middle with 27–35 continuous longitudinal costae, the inner smooth; antheridia 1–6, scattered; sperms 2, division horizontal; vegetative cell 8–16 by 50–165 μ; oogonium 29–38 by 69–100 μ; oospore 27–37 by 42–50 μ; antheridium 12–13 by 10–16 μ.

TYPE LOCALITY: Kittery, Maine.
DISTRIBUTION: Maine, Massachusetts, Indiana, North Carolina, Oklahoma.
PLATE 16. *f. 211–213*.

66. **Oedogonium Boscii** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 34. 1874.

? *Prolifera Boscii* Le Clerc, Mém. Mus. Paris **3**: 474. 1817.
Conferva vesicata Ag.; Desmaz. Pl. Crypt. *1355*. 1845.

Dioecious, macrandrous; oogonium 1 (rarely 2), oblong-ellipsoid, pore superior; oospore ellipsoid, not nearly filling oogonium longitudinally; spore-wall of three layers, the outer and middle layers with 27–35 continuous, rarely anastomosing, longitudinal ribs, the inner smooth; antheridia 1–8, scattered, often in upper part of filament; sperms 2, division vertical; female vegetative cell 14–23 by 45–135 μ, male 13–18 by 52–108 μ; oogonium 39–51 by 75–110 μ; oospore 36–43 by 56–70 μ; antheridium 13–14 by 6–16 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Connecticut, Ohio, Indiana, Illinois, Iowa, North Carolina, Florida, Mississippi, California; Puerto Rico; British Columbia.
PLATE 16. *f. 214, 215*.

66*a*. **Oedogonium Boscii** f. **dispar** Hirn, Acta Soc. Sci. Fenn. **27**: 124. 1900. Oospore smaller, ellipsoid-globose or subglobose; vegetative cell 14–21 by 60–170 μ; oogonium 38–45 by 70–92 μ; oospore 34–43 by 44–55 μ. TYPE LOCALITY: Medford, Massachusetts. DISTRIBUTION: Massachusetts, Pennsylvania, California. PLATE 16. *f. 216*.

67. **Oedogonium crenulatocostatum** Wittr. Bot. Notiser 1878: 139. 1878.

? *Oedogonium apiculatum* Wolle, Bull. Torrey Club **6**: 188. 1877.

Dioecious, macrandrous; oogonia 1–6, obovoid to subellipsoid, often terminal, pore superior; oospore of the same form, and nearly or quite filling the oogonium; outer spore-wall smooth, the median with 14–20 longitudinal ribs, crenulate and sometimes anastomosing, the inner smooth; antheridia 2–6, often alternating with vegetative cell; sperms 2, division horizontal; terminal cell obtuse to broadly apiculate; female vegetative cell 10–18 by 25–125 μ, male 9–13 by 32–80 μ; oogonium 30–36 by 40–65 μ; oospore 28–34 by 37–55 μ; antheridium 9–12 by 9–14 μ.

TYPE LOCALITY: Bethelehem, Pennsylvania.
DISTRIBUTION: New Hampshire, Massachusetts, Connecticut, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, North Carolina, Kentucky, Wyoming.
PLATE 15. *f. 204–206*.

67*a*. **Oedogonium crenulatocostatum** var. **cylindricum** (Hirn) Tiffany, var. nov. *Oedogonium Boscii* Wittr.; C. H. S. Phyc. Bor. Am. *118*. 1895. Not *O. Boscii* Wittr. 1874. *Oedogonium crenulatocostatum* f. *cylindricum* Hirn, Acta Soc. Sci. Fenn. **27**: 129. 1900. Oogonium and oospore cylindric-oblong or more rarely ellipsoid or obovoid-ellipsoid; ribs of oospore scarcely crenulate; vegetative cell 11–16 by 44–150 μ; oogonium 30–36 by 42–81 μ; oospore 27–34 by 40–65 μ. TYPE LOCALITY: Lynnsfield, Massachusetts. DISTRIBUTION: New Hampshire, Massachusetts, Connecticut, Ohio, Indiana, Illinois, Missouri. PLATE 15. *f. 207*.

68. **Oedogonium longiarticulatum** (Hansg.) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium crenulatocostatum var. *longiarticulatum* Hansg. Arch. Nat. Land. Böhmen **5**[6]: 46. 1886. *Oedogonium calosporum* Hirn, Acta Soc. Faun. Fl. Fenn. **11**[6]: 20. 1895.

Dioecious, macrandrous; oogonium single, obovoid to subellipsoid, pore superior; oospore obovoid to nearly ellipsoid, not filling oogonium, its wall of three layers, the outer and inner smooth, the middle with 12–18 longitudinal, distinctly crenate (sometimes appearing dentate) costae; the antheridia 2–5, often alternating with vegetative cell; sperms 2, division horizontal; vegetative cell 12–15 by 60–90 μ; oogonium 27–32 by 58–60 μ; oospore 24–30 by 44–52 μ; antheridium 8–11 by 10–14 μ.

TYPE LOCALITY: Bohemia.
DISTRIBUTION: Massachusetts, Ohio, Michigan.
PLATE 16. *f. 226, 227*.

69. **Oedogonium aureum** (Tilden) Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium crenulatocostatum var. *aureum* Tilden, Am. Algae *123*. 1896; Bot. Gaz. **25**: 90. 1898.

Dioecious, macrandrous; oogonium single, obovoid to nearly ellipsoid, pore superior; oospore obovoid to globose-ellipsoid, not completely filling oogonium; middle spore-wall with 12–16 dentate ribs (sometimes nearly areolate) connected by transverse ridges; antheridium 1–?; sperms 2, division horizontal; vegetative cell 10–13 by 35–110 μ; oogonium 30–35 by 38–50 μ; oospore 29–33 by 35–43 μ; antheridium 10 by 10 μ.

TYPE LOCALITY: Yellowstone National Park, Wyoming.
DISTRIBUTION: Ohio, Iowa, Wyoming, Colorado; Puerto Rico.
PLATE 16. *f. 217*.

70. **Oedogonium areolatum** Lagerh. Anal. Univ. Ecuador **4**[27]: 80. 1890.

Dioecious, macrandrous; oogonia 1–4, obovoid or obovoid-globose, with superior pore; oospore subellipsoid or ellipsoid-globose, filling or not filling oogonium; middle layer of spore-

wall areolate; antheridia 3–12; sperms 2; basal cell elongate; terminal cell apically obtuse; female vegetative cell 16–21 by 65–165 μ, male 15–19 by 60–140 μ; oogonium 48–60 by 60–75 μ; oospore 45–57 by 48–60 μ; antheridium 14–17 by 8–10 μ.

TYPE LOCALITY: Ecuador.
DISTRIBUTION: Ohio, Iowa.
PLATE 16. *f. 221–223.*

71. **Oedogonium subareolatum** Tiff. Brittonia 2: 168. 1936.

Monoecious; oogonium single, ellipsoid, filling the oogonium, with superior pore; oospore broadly ellipsoid, filling oogonium or not; membrane triple, the outer and inner spore-wall smooth, the middle areolate; antheridium single or 2–3 seriate, subepigynous; sperms 2, with horizontal division; basal cell elongate; vegetative cell 8–12 by 26–91 μ; oogonium 31–35 by 39–48 μ; oospore 29–32 by 36–42 μ; antheridium 9–10 by 4–6 μ; basal cell 7–13 by 97–100 μ.

TYPE LOCALITY: Santurce, Puerto Rico.
DISTRIBUTION: Puerto Rico.
PLATE 16. *f. 218, 219.*

72. **Oedogonium dictyosporum** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 13. 1874.

Monoecious; oogonia 1 or 2, obovoid-globose, with superior pore; oospore globose to ellipsoid-globose, usually not filling oogonium; outer layer of spore-wall reticulate, the inner smooth; antheridia 1–3, subepigynous; sperms 2; vegetative cell 11–16 by 25–95 μ; oogonium 33–40 by 38–46 μ; oospore 28–38 by 30–40 μ; antheridium 8–13 by 5–10 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Iowa.
PLATE 16. *f. 224.*

73. **Oedogonium foveolatum** Wittr. Bot. Notiser **1878**: 133. 1878.

Monoecious; oogonia 1 or 2, obovoid to subellipsoid-globose, with superior pore; oospore globose to subellipsoid-globose, filling or not filling oogonium; outer spore-wall scrobiculate; antheridia 1–7; sperms two, division horizontal; basal cell elongate, terminal cell apically obtuse; vegetative cell 14–23 by 35–115 μ; oogonium 37–49 by 38–61 μ; oospore 33–46 by 34–53 μ; antheridium 12–19 by 5–12 μ.

TYPE LOCALITY: St. Thomas, West Indies.
DISTRIBUTION: Indiana, Florida; Puerto Rico; St. Thomas.
PLATE 16. *f. 228.*

74. **Oedogonium scrobiculatum** Wittr.; Wittr. & Nordst. Algae Exsicc. *1018.* 1893; Bot. Notiser **1893**: 192. 1893.

Dioecious, macrandrous; oogonia 1–3, obovoid or subellipsoid, pore superior; oospore of same form as oogonium and nearly filling it; outer spore-wall scrobiculate, the inner smooth; antheridium 1–?; sperms 2, division horizontal; female vegetative cell 16–24 by 50–144 μ, male 15–19 by 45–110 μ; suffultory cell 21–30 by 34–90 μ; oogonium 40–48 by 60–88 μ; oospore 39–45 by 48–57 μ; antheridium 13–15 by 8–12 μ.

TYPE LOCALITY: Ecuador.
DISTRIBUTION: Florida.
PLATE 16. *f. 225.*

75. **Oedogonium verrucosum** Hallas, Bot. Tidssk. **26**: 408. 1905.

Dioecious, macrandrous; oogonia 1 or 2, broadly ellipsoid or obovoid-globose, pore superior; oospore globose or ellipsoid-globose, not filling oogonium; middle layer of spore-wall scrobiculate; suffultory cell enlarged; antheridia 4–?; sperms 2, division horizontal; basal cell elongate; terminal cell, frequently an oogonium, obtuse; female vegetative cell 11–26 by 45–200 μ;

suffultory cell 19–49 by 30–145 μ; oogonium 56–68 by 56–94 μ; oospore 52–64 by 44–68 μ; antheridium 16 by 16 μ; basal cell 30–35 by 45–160 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Michigan, Indiana.
PLATE 17. *f. 232–234.*

76. **Oedogonium Tiffanyi** Ackley, Trans. Am. Micr. Soc. **48**: 304. 1929.

Dioecious, macrandrous; oogonia 1 or 2, subdepressed-globose or broadly pyriform-globose, pore superior; oospore globose, nearly filling oogonium; median layer of spore-wall scrobiculate; suffultory cell enlarged; antheridia 1–7; sperms 2, division horizontal; basal cell ellipsoid-elongate; vegetative cell (15–) 21–24 by 100–240 μ; suffultory cell 25–32 by 100–230 μ; oogonium 64–76 by 65–69 μ; oospore 54–65 by 55–66 μ; antheridium 19–21 by 14–20 μ.

TYPE LOCALITY: Muskegon Lake, Michigan.
DISTRIBUTION: Michigan, Iowa, Florida.
PLATE 18. *f. 254–257.*

77. **Oedogonium punctatum** Wittr. Bot. Notiser **1878**: 142. 1878.

Dioecious, macrandrous; oogonia 1–4, obovoid (rarely globose-obovoid), pore superior; oospore obovoid, nearly filling oogonium (rarely subglobose and not filling oogonium); outer spore-wall scrobiculate; antheridia 1–5, often alternating with vegetative cell; sperms 2, division horizontal; basal cell elongate; terminal cell (often oogonium) apically obtuse; vegetative cell 15–22 by 42–128 μ; oogonium 38–45 (–48) by 52–65 μ; oospore 37–43 by 43–55 μ; antheridium 15–17 by 6–10 μ.

TYPE LOCALITY: Vera Cruz, Mexico.
DISTRIBUTION: Ohio, Florida; Mexico.
PLATE 17. *f. 244, 245.*

78. **Oedogonium argenteum** Hirn, Acta Soc. Sci. Fenn. **27**: 289. 1900.

Dioecious, macrandrous; oogonium 1, obovoid-globose to globose, pore superior (rarely supramedian); oospore ovoid to globose; outer layer of spore-wall scrobiculate; antheridia 3–4; sperms 2, division horizontal; basal cell elongate; female vegetative cell (14–) 20–28 by 80–160 μ, male 20–22 by 70–160 μ; oogonium 44–52 by 48–62 μ; oospore 43–48 by 44–50 μ; antheridium 22 by 8 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Michigan, Florida.
PLATE 17. *f. 237, 238.*

78*a*. **Oedogonium argenteum** f. **michiganense** Tiff. Oedog. Monog. 97. 1930. *Oedogonium argenteum* Ackley, Trans. Am. Micr. Soc. **48**: 302. 1929. Not *O. argenteum* Hirn. 1900. Middle wall of oospore scrobiculate; pore of oogonium supramedian; otherwise as in the species. TYPE LOCALITY: Roland Lake, Michigan. DISTRIBUTION: Michigan.

79. **Oedogonium figuratum** Tiff. Brittonia **2**: 167. 1936.

Dioecious, macrandrous; oogonium broadly pyriform or ovoid, single or 2–4-seriate, often terminal, with superior (rarely supreme) pore; oospore globose, not filling oogonium; outer and inner wall smooth, middle wall scrobiculate; antheridium single or 2–5 seriate; sperms 2 with horizontal division; vegetative cell often somewhat capitellate, 15–20 by 58–100 μ; oogonium 48–56 by 55–65 μ; oospore 45–52 by 45–52 μ; antheridium 15–17 by 9–14 μ.

TYPE LOCALITY: Puerto Rico.
DISTRIBUTION: Puerto Rico.
PLATE 16. *f. 229–231.*

80. **Oedogonium Wyliei** Tiff. Trans. Am. Micr. Soc. **45**: 90. 1926.

Dioecious, macrandrous; oogonia 1–4, globose to ovoid, pore superior; oospore globose to ovoid, filling or not filling oogonium; outer spore-wall irregularly scrobiculate; antheridia 1–4;

sperms 2, division horizontal; basal cell elongate; terminal cell, often an oogonium, apically obtuse or broadly apiculate; vegetative cell 16–24 by 80–170 μ; oogonium 52–64 by 68–112 μ; oospore 48–60 by 52–64 μ; antheridium 16–19 by 8–18 μ.

TYPE LOCALITY: Storm Lake, Iowa.
DISTRIBUTION: Ohio, Michigan, Indiana, Iowa, Florida; Puerto Rico.
PLATE 17. *f. 246–249.*

81. **Oedogonium indianense** Britton & Smith, Proc. Ind. Acad. **44**: 67. 1935.

Dioecious, macrandrous; oogonia 1–3, obovoid to nearly pyriform, pore superior; oospore globose to ovoid, usually not filling oogonium; outer spore-wall scrobiculate, inner smooth; antheridia 1–3; sperms 2, division horizontal; vegetative cell 10–16 by 72–110 μ; oogonium 36–46 by 50–64 μ; oospore 35–44 by 40–46 μ; antheridium 13–16 by 9–13 μ.

TYPE LOCALITY: Indiana.
DISTRIBUTION: Indiana.
PLATE 17. *f. 239–243.*

82. **Oedogonium americanum** Transeau, Ohio Jour. Sci. **17**: 231. 1917.

Dioecious, macrandrous; oogonium 1, globose to depressed-globose, pore superior; oospore globose, ellipsoid-globose, or depressed-globose, filling oogonium or not; spore-wall of three layers, the median layer scrobiculate, the outer and inner layers smooth; antheridia 1–5, frequently alternating with vegetative cells; sperms 2, division horizontal; basal cell elongate; terminal cell obtuse; female vegetative cell 28–48 by 40–100 μ, male cell 24–30 by 40–100 μ; oogonium 40–76 by 48–70 μ; oospore 38–74 by 46–56 μ; antheridium 20–28 by 4–12 μ.

TYPE LOCALITY: Charleston, Illinois.
DISTRIBUTION: Michigan, Illinois
PLATE 18. *f. 258–260.*

83. **Oedogonium taphrosporum** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 133. 1900.

Dioecious, macrandrous; oogonia 1–6, obovoid or obovoid-ellipsoid, pore superior; oospore globose or ellipsoid-globose, not filling oogonium; outer layer of spore-wall scrobiculate, inner layer smooth; antheridia 2–?; terminal cell, sometimes an oogonium, obtuse; basal cell elongate; vegetative cell 25–38 by 100–375 μ; oogonium 70–83 by 81–113 μ; oospore 58–65 by 62–70 μ; antheridium 24–32 by 8–12 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Massachusetts, Ohio, Michigan, Illinois, Florida.
PLATE 17. *f. 235, 236.*

84. **Oedogonium arcyosporum** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 104. 1900.

Monoecious; oogonia 1–5, obovoid to ellipsoid-globose, pore superior; oospore ellipsoid-globose to subglobose, not usually filling the oogonium; spore-wall of three layers, the outer and inner smooth, the median areolate; antheridia 1–4, subepigynous to subhypogynous; vegetative cell 13–20 by 50–200 μ; oogonium 41–55 by 43–68 μ; oospore 38–50 by 40–55 μ; antheridium 11–15 by 8–12 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Puerto Rico.
PLATE 16. *f. 220.*

85. **Oedogonium reticulocostatum** Jao, Rhodora **36**: 208. 1934.

Dioecious; oogonia 1–8, globose or subobovoid-globose, operculate, division supreme, narrow; oospore globose, orange at maturity, filling the oogonium, except in length; spore-wall

of three layers, the outer and inner smooth, the median layer with 10–22 longitudinal, toothed and thickened ribs, connected by transverse, sometimes anastomosing lines forming coarse reticulations; polar region reticulate, disc-shaped; polar axis transverse or oblique to the axis of filament; ribs in part not reaching the margin of the polar disk; vegetative cell slightly capitellate, the terminal cell apically obtuse to sharply conical, the basal cell enlarged; vegetative cell 8–16 by 44–86 μ; suffultory cell 22–26 by 44–58 μ; oogonium 26–38 by 32–46 (–72) μ; oospore 23–32 by 27–32 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 19. *f. 268, 269;* PLATE 36. *f. 555, 556.*

86. **Oedogonium pseudacrosporum** Wittr.; Hirn, Acta Soc. Sci. Fenn. **27**: 193. 1900.

Monoecious; oogonium 1, ellipsoid, operculate, division supreme, lid very small and often deciduous; oospore ellipsoid, completely filling oogonium, spore-wall coalescing with that of oogonium, longitudinally ribbed, ribs manifestly crenulate; antheridia 1–4, hypogynous or subepigynous; sperms 2, division horizontal; basal cell elongate; terminal cell long, setiform; vegetative cell 9–13 by 32–110 μ; oogonium (27–) 32–37 by (44–) 45–56 μ; antheridium 8–13 by 6–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Indiana, Iowa, Florida.
PLATE 18. *f. 252, 253.*

87. **Oedogonium eriense** Tiff. Trans. Am. Micr. Soc. **55**: 4. 1936.

Monoecious; oogonium ellipsoid to broadly ellipsoid, with superior operculum; oospore broadly ellipsoid to ovoid, not filling the oogonium longitudinally, with outer and inner walls smooth and median wall longitudinally costate, the ribs 18–26 in number; antheridium 1–?, subepigynous; sperm (?) single; vegetative cell 16–24 by 52–104 μ; oogonium 38–48 by 64–85 μ; oospore 36–46 by 48–70 μ; antheridium 16–19 by 15–16 μ.

TYPE LOCALITY: Lake Erie, Ohio.
DISTRIBUTION: Ohio.
PLATE 19. *f. 266, 267.*

88. **Oedogonium paucostriatum** Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium paucocostatum var. *gracile* Tiff. Ohio Jour. Sci. **21**: 273. 1921.

Dioecious, macrandrous; oogonium 1, ellipsoid, with superior operculum; oospore ellipsoid or occasionally globose-ellipsoid, filling oogonium or not, its outer and inner wall smooth, median wall with 15–20 longitudinal ribs; antheridia 2–4; sperms 2, division horizontal; vegetative cell 15–20 by 66–120 μ; oogonium 48–52 by 70–88 μ; oospore 44–48 by 60–70 μ; antheridium 17–20 by 8–12 μ.

TYPE LOCALITY: Akron, Ohio.
DISTRIBUTION: Ohio, Iowa; British Columbia.
PLATE 19. *f. 265.*

89. **Oedogonium paucocostatum** Transeau, Am. Jour. Bot. **1**: 300. 1914.

Dioecious, macrandrous; oogonium 1, ellipsoid, operculate, division superior; oospore ellipsoid, nearly filling the oogonium, the outer and inner walls smooth, the median longitudinally ribbed, ribs 15–19 in number; antheridia 2–8; sperms 2, division horizontal; terminal cell obtuse; basal cell usually elongate; vegetative cell (15–) 19–25 by 70–160 μ; oogonium 54–60 by 70–104 μ; oospore 50–56 by 66–90 μ; antheridium 18–23 by 8–12 μ.

TYPE LOCALITY: Casey, Illinois.
DISTRIBUTION: Ohio, Indiana, Illinois, Iowa, Oklahoma.
PLATE 19. *f. 263, 264.*

90. **Oedogonium nobile** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 14. 1874.

Monoecious; oogonium 1 (very rarely 2), ellipsoid or subobovoid-ellipsoid, operculate, division superior; oospore ellipsoid-globose or globose, not filling oogonium; spore-wall of three layers, the outer and inner layers smooth, the middle layer with 30–35 continuous longitudinal ribs, rarely anastomosing; antheridia 1–3, hypogynous; sperms 2, division horizontal; vegetative cell 16–20 by 80–180 μ; oogonium 57–65 by 67–90 μ; oospore 48–55 by 50–58 μ; antheridium 15–19 by 9–13 μ.

TYPE LOCALITY: Norway.
DISTRIBUTION: Massachusetts.
PLATE 18. *f. 261.*

90*a*. **Oedogonium nobile** var. **minus** Hirn, Acta Soc. Sci. Fenn. **27**: 190. 1900. *Oedogonium insigne* var. *minus* Hirn, Acta Soc. Faun. Fl. Fenn. 11^6: 15. 1895. Larger; oospore ellipsoid, filling oogonium; vegetative cell 13–22 by 80–240 μ; oogonium 58–63 by 85–100 μ; oospore 54–59 by 68–80 μ; antheridium 16–19 by 7–18 μ. TYPE LOCALITY: Finland. DISTRIBUTION: Massachusetts. PLATE 18. *f. 262.*

91. **Oedogonium mammiferum** Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 16. 1874.

? *Oedogonium huillense* W. & G. West, Jour. Bot. **35**: 5. 1897.

Monoecious; oogonium 1 (rarely 2 or 3), ellipsoid, with mammiform projections appearing as 7–9 radiations seen vertically, operculate, division inframedian, very narrow; oospore globose or subdepressed-globose (rarely depressed-globose), not filling oogonium; spore-wall smooth; antheridium 1, subepigynous; basal cell elongate; vegetative cell 5–8 by 20–56 μ; oogonium 20–28 by 20–30 μ; oospore 12–17 (–20) by 12–16 μ; antheridium 6 by 7 μ.

TYPE LOCALITY: Norway and Sweden.
DISTRIBUTION: Massachusetts, North Carolina.
PLATE 19. *f. 280–282.*

92. **Oedogonium Itzigsohnii** De Bary, Abh. Senck. Nat. Ges. 1: 56. 1854.

Oedogonium platygynum B. Eichler, Pam. Fizyjogr. 12^3: 158. 1893. Not *O. platygynum* Wittr. 1872.

Monoecious; oogonium 1, ellipsoid, with median, conically obtuse projections, appearing stellate in vertical view, with 7–10 radiations, operculate, division inframedian; oospore globose, not completely filling oogonium; spore-wall smooth; antheridia 1 or 2; terminal cell apically obtuse or apiculate; vegetative cell 8–10 by 25–60 μ; oogonium 34–40 by 32–40 μ; oospore 20–23 by 20–23 μ; antheridium 8–9 by 8–15 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Florida.
PLATE 19. *f. 283, 284.*

93. **Oedogonium Brittonii** Tiff. Brittonia **2**: 167. 1936.

Monoecious; oogonium single or 2–4 seriate, globose or depressed-globose, with basal operculum; oospore of the same form as the oogonium and filling it or nearly so; spore-wall smooth; antheridium single, hypogynous or subhypogynous or subepigynous; sperm single; vegetative cell evidently capitellate, sometimes incrusted with calcium carbonate; vegetative cell 16–22 by 20–65 μ; oogonium 32–42 by 30–36 μ; oospore 30–39 by 29–32 μ; antheridium 16–18 by 11–13 μ.

TYPE LOCALITY: Santurce, Puerto Rico.
DISTRIBUTION: Puerto Rico.
PLATE 20. *f. 300–302.*

94. **Oedogonium Howei** Tiff. Brittonia **2**: 166. 1936.

Dioecious, macrandrous; oogonium depressed-globose or globose (rarely subglobose), with basal operculum; oospore of the same form as the oogonium and filling it; spore-wall smooth; antheridia up to 20-seriate or single (often alternating with vegetative cell); sperm single (?); basal cell hemispheric or depressed-globose; vegetative cell capitellate, 8–14 by 21–78 μ; oogonium 27–36 by 22–30 μ; oospore 25–34 by 20–27 μ; antheridium 9–11 by 8–14 μ; basal cell 16–23 by 13–16 μ.

TYPE LOCALITY: Arecibo, Puerto Rico.
DISTRIBUTION: Ohio; Puerto Rico.
PLATE 20. *f. 297–299*.

95. **Oedogonium infimum** Tiff. Ohio Jour. Sci. **24**: 183. 1924.

Dioecious, macrandrous; oogonium 1, globose or subglobose (or the basal part extended, appearing subpyriform-globose), operculate, division at the lowest extremity of the oogonium; oospore globose or subglobose; spore-wall smooth; male plants a little larger than the female; antheridia 1–10; sperms 2; vegetative cell distinctly capitellate; basal cell of filament subhemispheric, not elongated; filaments not infrequently incrusted with lime; female vegetative cell 12–18 by 60–140 μ, male 16–20 by 60–140 μ; oogonium 40–48 by 41–50 μ; oospore 40–44 by 38–42 μ; antheridium 14–20 by 8–12 μ; basal cell 30–42 by 16–24 μ.

TYPE LOCALITY: Swan Lake, Iowa.
DISTRIBUTION: Ohio, Iowa.
PLATE 20. *f. 294–296*.

96. **Oedogonium inversum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**[6]: 47. 1876; Tiff. Oedog. Monog. 100. 1930.

? *Oedogonium monticchii* Fior.-Mazz. Atti Accad. Nuovi Lincei **13**: 259. 1860.
Oedogonium inversum var. *subclusum* Wittr.; Wittr. & Nordst. Algae Exsicc. *26*, in part. 1877; Bot. Notiser **1877**: 25. 1877.
Oedogonium inversum f. *subclusum* Hirn, Acta Soc. Sci. Fenn. **27**: 180. 1900.

Dioecious, macrandrous; oogonia 1–4, globose or subglobose, operculate, division inferior; oospore globose, quite filling the oogonium; spore-wall smooth; antheridia 1–8; sperm 1; vegetative cell capitellate; basal cell subhemispheric, not elongate; filament not infrequently incrusted with lime; vegetative cell 10–14 by 20–100 μ; oogonium 28–35 by 24–34 μ; oospore 26–32 by 22–30 μ; antheridium 10–12 by 9–12 μ; basal cell 13–20 by 7–14 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Iowa; Puerto Rico.
PLATE 20. *f. 308–311*.

97. **Oedogonium Gunnii** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 37. 1874; Tiff. Oedog. Monog. 110. 1930.

Monoecious; oogonia 1–4, subdepressed- or depressed-globose, operculate, division median, narrow but distinct; oospore same form as oogonium and filling it; spore-wall smooth, the outer layer thick and hyaline, the inner brown; antheridium subepigynous; vegetative cell 6–9 by 30–85 μ; oogonium 23–29 by 19–29 μ; oospore 22–27 by 17–23 μ; antheridium 6 by 12 μ.

TYPE LOCALITY: Tasmania.
DISTRIBUTION: Indiana, Florida, Alabama, Oklahoma.
PLATE 19. *f. 278*.

98. **Oedogonium acmandrium** Elfv.; Hirn, Acta Soc. Faun. Fl. Fenn. **11**[6]: 13. 1895.

Monoecious; oogonia 1 or 2, depressed-globose or subglobose, operculate, division median and narrow; oospore depressed-globose or subglobose, filling oogonium, its wall smooth; antheridia 1–3, subepigynous, epigynous, or hypogynous, often terminal; sperm single; basal cell

elongate; vegetative cell 7–10 by 30–80 μ; oogonium 30–35 by 28–38 μ; oospore 28–33 by 25–29 μ; antheridium 8–10 by 10–15 μ.

TYPE LOCALITY: Finland.
DISTRIBUTION: Massachusetts, Illinois.
PLATE 19. *f. 285.*

99. **Oedogonium psaegmatosporum** Nordst. Oefv. Sv. Vet.-Akad. Förh. **34**[4]: 24. 1877.

Monoecious; oogonia 1–5, broadly pyriform-globose, operculate, division median, narrow but distinct; oospore depressed-globose to globose, inflating the middle part of oogonium; spore-wall smooth (?); antheridia to 15-seriate, hypogynous, cell a little tumid; sperm single; vegetative cell 9–10 by 56–80 μ; oogonium 28–33 by 33–40 μ; oospore 27–31 by 24–27 μ; antheridium 9–12 by 6–10 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Wyoming.
PLATE 19. *f. 279.*

100. **Oedogonium Howardii** G. West, Jour. Bot. **42**: 281. 1904; Tiff. Brittonia **2**: 169. 1936.

Oedogonium Howardii var. *minus* Tiff. Bot. Gaz. **83**: 204. 1927.

Dioecious, macrandrous; oogonium single or double, globose or subglobose, with broad median operculum; oospore globose, filling oogonium, its wall smooth; antheridia to 16-seriate, sperm single; vegetative cell evidently capitellate; basal cell subhemispheric to nearly spheric; vegetative cell 7–12 by 18–42 μ; oogonium 26–33 by (23–) 26–33 μ; oospore 21–30 by 24–30 μ; antheridium 7–9 by 5–14 μ; basal cell 12–20 by 10–13 μ.

TYPE LOCALITY: Barbados.
DISTRIBUTION: Ohio, Illinois, Florida, Oklahoma; Barbados.
PLATE 20 *f. 290, 291.*

101. **Oedogonium pratense** Transeau, Am. Jour. Bot. **1**: 297. 1914.

Dioecious, macrandrous; oogonium 1 (rarely 2), subdepressed-globose or broadly pyriform-globose, operculate, division median, narrow but distinct; oospore depressed-globose or subglobose, filling or nearly filling oogonium; spore-wall smooth; antheridia 1 or 2, usually alternating with vegetative cell; sperm 1; basal cell elongate; female vegetative cell 10–17 by 35–95 μ, male 8–15 by 32–82 μ; oogonium 33–40 by 35–50 μ; oospore 32–38 by 28–35 μ; antheridium 10–14 by 13–18 μ.

TYPE LOCALITY: Charleston, Illinois.
DISTRIBUTION: Massachusetts, Ohio, Michigan, Indiana, Illinois, Iowa, Alabama, Mississippi.
PLATE 21. *f. 325, 326.*

102. **Oedogonium mitratum** Hirn, Acta Soc. Faun. Fl. Fenn. 11[6]: 22. 1895; Tiff. Oedog. Monog. 105. 1930.

Dioecious, macrandrous; oogonia 1–4, globose or subglobose, operculate, division supramedian or superior, narrow but distinct; oospore globose (rarely subglobose), filling oogonium; spore-wall smooth; antheridia 1–5, subepigynous; sperms 2, division horizontal; vegetative cell often capitellate; vegetative cell 4–10 by 18–80 μ; oogonium 18–27 by 20–35 μ; oospore 17–23 by 17–23 μ; antheridium 6–9 by 6–8 μ.

TYPE LOCALITY: Finland,
DISTRIBUTION: Massachusetts, Ohio, Illinois, North Carolina, Oklahoma.
PLATE 19. *f. 270, 271.*

103. **Oedogonium abbreviatum** (Hirn) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium Pringsheimii var. *abbreviatum* Hirn, Acta Soc. Sci. Fenn. **27**: 173. 1900.
Oedogonium Pringsheimii var. *brevius* Jao, Papers Mich. Acad. **20**: 61. 1935.

Dioecious, macrandrous; oogonia 1–3, obovoid-globose to depressed-globose, operculate, division superior; oospore similar to oogonium in shape, its wall smooth; antheridia 1–6, often alternating with vegetative cell; sperms 2, division horizontal; basal cell elongate; upper cells of filament usually shorter than lower ones; vegetative cell 10–22 by 15–50 μ; oogonium 28–37 by 26–38 μ; oospore 26–34 by 24–35 μ; antheridium 9–16 by 5–10 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Massachusetts, Indiana, Oklahoma; Puerto Rico.
PLATE 21. *f. 318*.

104. **Oedogonium Pringsheimii** Cramer, Hedwigia **2**: 17. 1859; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 33. 1874.

Oedogonium pachydermatosporum Nordst. Minnesskr. Fys. Sällsk. Lund **7**: 21. 1878.
Oedogonium Pringsheimii var. *Nordstedtii* f. *pachydermatosporum* Hirn, Acta Soc. Sci. Fenn. **27**: 173. 1900.

Dioecious, macrandrous; oogonia 1–6, subovoid-globose, operculate, division superior; oospore globose, nearly filling oogonium; spore-wall smooth, often thick; antheridia to 10-seriate, often alternating with vegetative cell; sperms 2, division horizontal; basal cell elongate; terminal cell broadly apiculate or obtuse; female vegetative cell 14–20 by 28–100 μ, male 12–16 by 24–64 μ; oogonium 35–43 by 36–46 μ; oospore 30–37 by 30–37 μ; antheridium 10–15 by 6–9 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: New York, Pennsylvania, Ohio, Michigan, Indiana, Iowa, Florida, Utah; Puerto Rico.
PLATE 21. *f. 312, 313*.

104*a*. **Oedogonium Pringsheimii** var. **Nordstedtii** (Wittr.) Wittr.; Wittr. & Nordst. Algae Exsicc. *8*. 1877. *Oedogonium ciliare* De Not. Erb. Critt. Ital. II. 29. 1868; Hedwigia **7**: 120. 1868. *Oedogonium Nordstedtii* Wittr. Bot. Notiser **1872**: 6. 1872. *Oedogonium Euganeorum* Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 39. 1874. *Oedogonium pachydermatosporum* Lewin, Bih. Sv. Vet.-Akad. Handl. **14**^{1}: 18. 1888. Not *O. pachydermatosporum* Nordst. 1878. *Oedogonium Franklinianum* Tilden, Am. Algae *2*. 1894. Not *O. Franklinianum* Wittr. 1880. *Oedogonium Pringsheimii* var. *Nordstedtii* f. *Euganeorum* Hirn. Acta Soc. Sci. Fenn. **27**: 172. 1900. Smaller than the species; oogonia 1 or 2; oospore not filling oogonium; female vegetative cell 10–16 by 20–76 μ, male 9–15 by 18–68 μ; oogonium 28–36 by 36–45 μ; oospore 26–34 by 27–34 μ; antheridium 9–12 by 8–9 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Ohio, Michigan, Indiana, Illinois, Iowa, Minnesota, California: Puerto Rico: Greenland. PLATE 21. *f. 314–317*.

105. **Oedogonium epiphyticum** Transeau & Tiff.; Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium pisanum var. *gracile* Transeau & Tiff. Ohio Jour. Sci. **19**: 241. 1919.

Dioecious, macrandrous; oogonia 1–3, ellipsoid to ellipsoid-ovoid, with superior operculum; oospore ellipsoid to ellipsoid-ovoid to nearly globose, nearly filling oogonium; spore-wall smooth; antheridia 1 or 2; sperms 2, division horizontal; basal cell elongate; female vegetative cell 6–9 by 18–48 μ, male 5–8 by 16–45 μ; oogonium 16–20 by 20–30 μ; oospore 15–18 by 18–28 μ; antheridium 5–7 by 5–10 μ.

TYPE LOCALITY: Coffeen, Illinois.
DISTRIBUTION: Michigan, Indiana, Illinois, Iowa, Alabama, Mississippi.
PLATE 21. *f. 319, 320*.

106. **Oedogonium pisanum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**^{6}: 50. 1876.

Oedogonium subpisanum Lewin, Bih. Sv. Vet.-Akad. Handl. **14**^{1}: 17. 1888.

Dioecious, macrandrous; oogonium 1 (rarely 2 or 3), ellipsoid-ovoid to ovoid, operculate, division superior; oospore ovoid to ellipsoid, nearly filling oogonium; spore-wall smooth;

antheridia 1–4; sperms 2, division horizontal; basal cell elongate; terminal cell piliferous; vegetative cell 5–12 by 12–72 μ; oogonium 23–29 (–32) by 34–43 (–45) μ; oospore 21–25 by 27–37 μ; antheridium 4–9 by 5–9 μ.

TYPE LOCALITY: Italy.
DISTRIBUTION: Ohio, Indiana, Illinois, Iowa, Missouri, Mississippi.
PLATE 21. *f. 323, 324.*

107. **Oedogonium nanum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 37. 1874; Tiff. Trans. Am. Micr. Soc. **45**: 97. 1926.

Dioecious, macrandrous; oogonia 1–3, ovoid to broadly ellipsoid, operculate, division superior; oospore ovoid to globose-ellipsoid, usually filling the oogonium; spore-wall smooth; antheridia 1–3; sperm 1; basal cell subhemispheric; terminal cell, often an oogonium, apically obtuse; vegetative cell, often irregularly swollen, 6–10 by 15–33 μ; oogonium 24–28 by 30–36 μ; oospore 21–27 by 23–30 μ; antheridium 7–10 by 8–11 μ; basal cell 14–17 by 12–16 μ.

TYPE LOCALITY: India.
DISTRIBUTION: Iowa; Puerto Rico.
PLATE 22. *f. 345, 346.*

108. **Oedogonium porrectum** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 186. 1900.

Dioecious, macrandrous; oogonium 1, oblong, operculate, division superior; oospore ellipsoid or globose-ellipsoid, not filling oogonium longitudinally; spore-wall smooth; antheridia to 4-seriate; sperms 2, division horizontal; female vegetative cell 7–10 by 25–55 μ, male 6–9 by 25–62 μ; oogonium 24–27 by 44–53 μ; oospore 23–24 by 25–28 μ; antheridium 6–7 by 6–8 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Indiana, Florida, Wyoming.
PLATE 21. *f. 321, 322.*

109. **Oedogonium Welwitschii** W. & G. West, Jour. Bot. **35**: 5. 1897.

Dioecious, macrandrous; oogonia 1–3, subovoid-globose, operculate, division superior; oospore globose, filling or not filling oogonium; spore-wall smooth; antheridia 2; female vegetative cell 20–28 by 25–84 μ, male 17–20 by 35–80 μ; oogonium 43–50 by 43–52 μ; oospore 35–43 by 35–42 μ; antheridium 16–18 by 7–9 μ.

TYPE LOCALITY: Africa.
DISTRIBUTION: Illinois, Iowa, Alabama.
PLATE 21. *f. 334, 335.*

110. **Oedogonium iowense** Tiff. Ohio Jour. Sci. **24**: 181. 1924.

Dioecious, macrandrous; oogonia 1 or 2, globose or ellipsoid-globose, operculate, division superior; oospore of the same form as the oogonium, which it completely fills or not; spore-wall smooth; antheridia 1–25; sperms 2, division horizontal; basal cell of filament commonly elongate; vegetative cell 10–16 by 44–100 μ; oogonium 52–60 by 60–80 μ; oospore 45–56 by 50–64 μ; antheridium 10–12 by 10–20 μ; basal cell 16–24 by 60–80 μ.

TYPE LOCALITY: West Lake Okoboji, Iowa.
DISTRIBUTION: Ohio, Indiana, Iowa, Kentucky, Florida.
PLATE 21. *f. 331–333.*

111. **Oedogonium Pithophorae** Wittr. Bot. Notiser **1878**: 141. 1878.

Monoecious; oogonium 1, pyriform-globose, operculate, division superior; oospore globose, almost filling oogonium; spore-wall smooth, often thick; antheridium 1–?, subepigynous; basal

cell elongate; vegetative cell 9–11 by 24–48 μ; oogonium 26–30 by 27–35 μ; oospore 25–29 by 24–29 μ; antheridium 8–10 by 7–9 μ.

TYPE LOCALITY: St. Thomas, West Indies.
DISTRIBUTION: St. Thomas.
PLATE 22. *f. 350*.

112. **Oedogonium loricatum** Hirn, Acta Soc. Faun. Fl. Fenn. **11**[6]: 22. 1895.

Monoecious; oogonium 1 (rarely 2), subpyriform-globose, sometimes subglobose, operculate, division superior; oospore subglobose or subdepressed-globose, quite filling oogonium; spore-wall smooth; antheridia 1 or 2, subepigynous; sperms 2, division horizontal; vegetative cell 8–11 by 30–75 μ; oogonium 23–28 by 23–40 μ; oospore 22–26 by 21–24 μ; antheridium 7–8 by 5–7 μ.

TYPE LOCALITY: Finland.
DISTRIBUTION: Puerto Rico.
PLATE 21. *f. 327*.

113. **Oedogonium amplius** (W. R. Taylor) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium pyrulum var. *amplius* W. R. Taylor, Proc. Acad. Phila. **80**: 107. 1928.

Monoecious; oogonium 1, subglobose-pyriform, operculate, division superior; oospore globose, not filling oogonium, its wall smooth; antheridia 1 or 2, subepigynous; basal cell elongate; vegetative cell 9–12 by 40–64 μ; oogonium 34–40 by 30–44 μ; oospore 26–28 by 26–28 μ; antheridium 10–11 by 6–7 μ.

TYPE LOCALITY: Purcell Range, British Columbia.
DISTRIBUTION: British Columbia.
PLATE 21. *f. 328*.

114. **Oedogonium pyriforme** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 39. 1874.

Monoecious; oogonium 1, pyriform, operculate, division superior; oospore pyriform, filling or not filling oogonium; spore-wall smooth; antheridia 1–3, subepigynous, epigynous, hypogynous, or scattered; sperms 2, division horizontal; vegetative cell 13–16 by 48–90 μ; oogonium 40–46 by (44)48–60 μ; oospore 36–42 by 36–44 μ; antheridium 10–12 by 8–12 μ.

TYPE LOCALITY: Tasmania.
DISTRIBUTION: Wyoming; British Columbia.
PLATE 22. *f. 349*.

115. **Oedogonium crispum** (Hassall) Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 10. 1874.

? *Vesiculifera vernalis* Hassall, Ann. Mag. Nat. Hist. **11**: 434. 1843.
Vesiculifera crispa Hassall, Hist. Brit. Fresh-w. Algae **1**: 203. 1845.
? *Vesiculifera Candollei* Hassall, Hist. Brit. Fresh-w. Algae **1**: 208. 1845.
Oedogonium rostellatum Pringsh. Jahrb. Wiss. Bot. **1**: 69. 1857.
Oedogonium vernale Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 10. 1874.
Oedogonium crispum var. *elongatum* Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**[6]: 45. 1876.
Oedogonium hispanicum Lewin, Bih. Sv. Vet.-Akad. Handl. **14**[1]: 16. 1888.
Oedogonium crispum f. *vernale* Hirn, Acta Soc. Sci. Fenn. **27**: 161. 1900.

Monoecious; oogonium usually 1, obovoid-globose, operculate, division superior; oospore globose or subglobose, quite filling the oogonium; spore-wall smooth; antheridia 1–5, subepigynous or hypogynous; sperms 2, division horizontal; basal cell elongate; terminal cell apically obtuse; vegetative cell (10)12–16 by 35–80 μ; oogonium 37–45 by 41–53 μ; oospore 35–43 by 37–43 μ; antheridium 8–14 by 7–12 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Massachusetts, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Kentucky, North Carolina, Florida, Alabama, Mississippi, Oklahoma, Colorado, Wyoming, California; Alaska; British Columbia; Greenland; Puerto Rico.
PLATE 22. *f. 336, 337.*

115*a*. **Oedogonium crispum** f. **inflatum** Hirn, Acta Soc. Sci. Fenn. **27**: 161. 1900. *Oedogonium vesicatum* var. *flavescens* Kütz.; Rab. Alg. Sachs. *271.* 1853. *Oedogonium rostellatum* Pringsh.; Rab. Alg. Eur. *2275.* 1872. Oogonium obovoid-globose; vegetative cell 12–16 by 35–95 μ; oogonium 40–50 by 45–53 μ; oospore 37–45 by 38–45 μ; antheridium 8–12 by 9–12 μ. TYPE LOCALITY: Europe. DISTRIBUTION: Michigan, Florida, Mississippi. PLATE 22. *f. 341.*

115*b*. **Oedogonium crispum** var. **gracilescens** Wittr.; Wittr. & Nordst. Algae Exsicc. *509.* 1883; Bot. Notiser **1883**: 148. 1883. *Oedogonium Lagerheimii* Wittr.; Wittr. & Nordst. Algae Exsicc. *1018*, in part. 1893; Bot. Notiser **1893**: 192. 1893. More slender than the species; oogonium varying from obovoid-globose to subellipsoid; oospore globose to ovoid; vegetative cell 10–14 by 30–70 μ; oogonium 33–39 by 33–51 μ; oospore 32–37 by 33–42 μ; antheridium 9–10 by 7–9 μ. TYPE LOCALITY: Brazil. DISTRIBUTION: Massachusetts, Ohio, Michigan, Illinois, Minnesota, Iowa, Missouri, Kentucky, Mississippi, Louisiana, Oklahoma. PLATE 22. *f. 338.*

115*c*. **Oedogonium crispum** var. **uruguayense** Magnus & Wille; Wille, Bih. Sv. Vet.-Akad. Handl. **8**[18]: 39. 1884. *Oedogonium crispum* f. *gracile* Wittr. & Nordst. Algae Exsicc. *704.* 1886. *Oedogonium crispum* var. *uruguayense* f. *proprium* Hirn, Acta Soc. Sci. Fenn. **27**: 164. 1900. Oogonium subobovoid-globose, usually filled by oospore; antheridia subepigynous or hypogynous or scattered; vegetative cell 10–14 by 16–51 μ; oogonium 30–38 by 30–45 μ; oospore 27–35 by 27–37 μ; antheridium 8–13 by 6–12 μ. TYPE LOCALITY: Uruguay. DISTRIBUTION: Massachusetts, Pennsylvania. PLATE 22. *f. 339.*

115*d*. **Oedogonium crispum** var. **hawaiense** Nordst. Minneskr. Fys. Sällsk. Lund **7**: 20. 1878. Oogonium subovoid-globose to pyriform-globose, not filled by oospore; terminal cell mucronate or shortly setigerous; vegetative cell 10–16 by 20–64 μ; oogonium 30–38 by 31–38 μ; oospore 27–32 by 27–33 μ; antheridium 8–11 by 6–8 μ. TYPE LOCALITY: Hawaii. DISTRIBUTION: Florida. PLATE 22. *f. 342.*

115*e*. **Oedogonium crispum** var. **granulosum** Nordst. Oefv. Sv. Vet.-Akad. Förh. **34**[4]: 24. 1877; Taft, Bull. Torrey Club **62**: 285. 1935. *Oedogonium crispum* f. *granulosum* Hirn, Acta Soc. Sci. Fenn. **27**: 162. 1900. Oogonium subglobose to obovoid-globose, almost completely filled by the oospore; antheridia subepigynous or hypogynous; wall of oospore punctate-granulate; vegetative cell 13–17 by 29–63 μ; oogonium 36–43 by 42–46 μ; oospore 34–40 by 34–40 μ; antheridium 8–13 by 7–11 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Oklahoma. PLATE 22. *f. 340.*

116. **Oedogonium obesum** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **27**: 166. 1900.

Oedogonium pyrulum var. *obesum* Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**[6]: 44. 1876.

Monoecious; oogonia 1 or 2, obovoid-globose, operculate, division superior; oospore globose, not quite filling oogonium; spore-wall smooth, often thick; antheridia 1 or 2, subepigynous or more rarely subhypogynous; sperms 2, division horizontal; vegetative cell 12–16 by 35–75 μ; oogonium 40–43 by 38–44 μ; oospore 33–35 by 33–35 μ; antheridium 11–14 by 10–15 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: Massachusetts; Puerto Rico.
PLATE 22. *f. 351, 352.*

117. **Oedogonium autumnale** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 11. 1874.

Monoecious; oogonium 1, obovoid-globose, operculate, division superior; oospore globose or subglobose, completely filling oogonium (or nearly so); spore-wall smooth; antheridia 1 or 2, subepigynous, hypogynous, or scattered; sperms 2, division horizontal; basal cell elongate; terminal cell broadly apically acute; vegetative cell 16–20 by 25–50 μ; oogonium 39–45 by 45–51 μ; oospore 37–42 by 37–44 μ; antheridium 15–18 by 9–10 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Pennsylvania, Iowa.
PLATE 22. *f. 354.*

118. **Oedogonium rupestre** Hirn, Acta Soc. Sci. Fenn. **27**: 168. 1900.

Oedogonium rupestre f. *pseudautumnale* Hirn, Acta Soc. Sci. Fenn. **27**: 169. 1900.

Monoecious; oogonium 1, suboboviform-globose, with superior operculum; oospore globose, not filling oogonium, its wall smooth; antheridia 1–3, subepigynous or hypogynous; sperms 2,

division horizontal; vegetative cell 20–27 by 26–67 μ; oogonium 45–58 by 45–60 μ; oospore 43–54 by 43–54 μ; antheridium 18–22 by 9–14 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Mississippi.
PLATE 22. *f. 348*.

119. **Oedogonium gracillimum** Wittr. & Lundell; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 15. 1874.

Monoecious; oogonium 1, oblong, operculate, division superior; oospore oblong-ellipsoid, not filling oogonium; spore-wall smooth; antheridium 1; sperms 2, division horizontal; basal cell elongate; vegetative cell 4–7 by 16–42 μ; oogonium 14–19 by 34–40 μ; oospore 13–17 by 24–32 μ; antheridium 3–5 by 4–7 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Kentucky, Florida, Alabama, Mississippi; Puerto Rico.
PLATE 22. *f. 353*.

120. **Oedogonium oblongellum** Kirchner; Hirn, Acta Soc. Sci. Fenn. **27**: 182. 1900.

Monoecious; oogonium 1, ellipsoid-obovoid, operculate, division superior; oospore ellipsoid, nearly filling oogonium; spore-wall smooth; antheridia 1 or 2, hypogynous or scattered; sperms 2, division horizontal; terminal cell obtuse; vegetative cell 7–9 by 11–36 μ; oogonium 20–24 by 25–33 μ; oospore 18–22 by 24–30 μ; antheridium 6–8 by 4–12 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Illinois, Mississippi.
PLATE 22. *f. 347*.

121. **Oedogonium Hallasiae** Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium sphaericum Hallas, Bot. Tidssk. **26**: 406. 1905. Not *O. sphaericum* Kütz.
Oedogonium oblongum f. *sphaericum* Hirn, Acta Soc. Sci. Fenn. **34**^{3}: 18. 1906.
Oedogonium oblongum var. *sphaericum* Taft, Bull. Torrey Club **62**: 288. 1935.

Monoecious; oogonium 1, oblong, with superior operculum (sometimes nearly supreme); oospore globose to globose-ovoid, not filling oogonium lengthwise, its wall smooth; antheridia 1–3, sperms 2, division horizontal; basal cell elongate; vegetative cell 5–11 by 20–86 μ; oogonium 21–28 by 30–52 μ; oospore 16–27 by 16–30 μ; antheridium 8–9 by 6–7 μ; basal cell 5–9 by 65–72 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Oklahoma.
PLATE 21. *f. 329, 330*.

122. **Oedogonium oblongum** Wittr. Bot. Notiser **1872**: 2. 1872.

Monoecious; oogonium 1, oblong, operculate, division superior; oospore ellipsoid to ovoid, not filling oogonium longitudinally; spore-wall smooth; antheridia 1–3, sperms 2, division horizontal; basal cell elongate; vegetative cell 6–11 by 20–86 μ; oogonium 20–26 by 41–60 μ; oospore 19–23 by 30–36 μ; antheridium 6–9 by 7–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan, Indiana, Illinois, Iowa, Florida, Mississippi.
PLATE 22. *f. 343*.

122*a*. **Oedogonium oblongum** var. **majus** Nordst.; Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**^{6}: 45. 1876. *Oedogonium oblongum* f. *majus* (Nordst.) Hirn, Acta Soc. Sci. Fenn. **27**: 185. 1900. Vegetative cell 8–11 by 35–75 μ; oogonium 26–28 by 42–50 μ; oospore 22–26 by 31–34 μ; antheridium 8–9 by 9–10 μ. TYPE LOCALITY: Europe. DISTRIBUTION: Michigan. PLATE 22. *f. 344*.

123. **Oedogonium Ahlstrandii** Wittr.; Wittr. & Nordst. Algae Exsicc. *401*, in part. 1882; Bot. Notiser **1882**: 53. 1882.

Monoecious; oogonium 1, ellipsoid, operculate, division superior; oospore ellipsoid, filling oogonium, its wall smooth; antheridia 1 or 2, hypogynous; sperms 2, division horizontal; terminal cell apically obtuse; vegetative cell 10–18 by 30–180 μ; oogonium 35–42 by 57–69 μ; oospore 34–41 by 53–62 μ; antheridium 13–17 by 9–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New York, Florida.
PLATE 22. *f. 355.*

124. **Oedogonium pachydermum** Wittr. & Lundell; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 125. 1870.

Monoecious; oogonium 1 (rarely 2), ellipsoid, operculate, division superior, wall frequently thick; oospore ellipsoid, not filling oogonium; spore-wall smooth; antheridia 1–3, hypogynous or subepigynous, often terminal; sperms 2, division horizontal; basal cell elongate; terminal cell apiculate; vegetative cell 21–27 by 34–120 μ; oogonium 50–70 by 75–100 μ; oospore 40–60 by 50–80 μ; antheridium 18–21 by 10–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan, Indiana, Wyoming.
PLATE 23. *f. 359, 360.*

125. **Oedogonium Huntii** H. C. Wood, Proc. Am. Phil. Soc. **10**: 335. 1867.

Androgynia Huntii H. C. Wood, Fresh-w. Algae N. Am. 197. 1873.

Dioecious, nannandrous; oogonium usually 1, subglobose or subobovoid-globose (rarely subhexagonal), pore inferior; oospore globose, not filling oogonium; outer spore-wall with four raised spiral ribs; basal cell elongate; terminal cells tapering, setiferous (consisting of 10 or more superimposed long cylindric cells, each smaller in diameter than the one below); dwarf male nearly straight, on suffultory cell, antheridia exterior, 1 or 2 (?); vegetative cell 15–25 by 36–82 μ; oogonium 50–60 by 52–60 μ; oospore 38–42 by 38–42 μ; dwarf male stipe 11 by 52 μ; antheridium 10 by 30 μ.

TYPE LOCALITY: Philadelphia, Pennsylvania.
DISTRIBUTION: Massachusetts, Pennsylvania.
PLATE 30. *f. 471–473.*

126. **Oedogonium hispidum** Nordst.; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 128. 1870.

Dioecious, nannandrous, gynandrosporous; oogonium 1, terminal, subellipsoid or ellipsoid-globose, pore inferior; oospore globose to globose-ellipsoid, not filling oogonium or rarely enlarging it; outer spore-wall echinate; androsporangia 2; terminal cell obtuse; dwarf male a little curved, on suffultory cell, antheridium exterior, 1; vegetative cell 9–14 by 36–130 μ; oogonium 35–44 by 42–56 μ; oospore (with spines) 32–39 by 32–40 μ; androsporangium 10–12 by 6–8 μ; dwarf male stipe 7–8 by 17–18 μ; antheridium 5–6 by 7–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan.
PLATE 30. *f. 477.*

127. **Oedogonium fuscum** Taft, Bull. Torrey Club **62**: 286. 1935.

Dioecious, nannandrous, gynandrosporous; oogonium single, ellipsoid-globose to globose, pore median to inframedian; oospore ellipsoid-globose to globose, completely filling the oogonium or not; outer spore-wall reticulate-verrucose, brown; suffultory cell enlarged; androsporangia ?–3, epigynous; dwarf male slightly curved, on suffultory cell; antheridia 1 or 2, exterior;

vegetative cell 10–17 by 33–73 μ; suffultory cell 23–27 by 50–53 μ; oogonium 36–43 by 46–56 μ; oospore 34–40 by 42–46 μ; androsporangium 10–11 by 7–10 μ; dwarf male stipe 7–9 by 20–23 μ; antheridium 6–7 by 5–7 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 30. *f. 474–476.*

128. **Oedogonium canadense** (Tiff.) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium Hystrix Skuja, Acta Horti Univ. Latv. **2**: 99. 1927. Not *O. Hystrix* Wittr. 1870.
Oedogonium Hystrix var. *canadense* Tiff. Ohio Jour. Sci. **29**: 74. 1929.

Dioecious, nannandrous, gynandrosporous; oogonium 1, ellipsoid, pore inframedian; oospore broadly ellipsoid, not quite filling oogonium, its outer wall echinate; androsporangium 1–?; dwarf male slightly curved, on suffultory cell, antheridium exterior, 1; suffultory cell enlarged; vegetative cell 14–25 by 80–125 μ; suffultory cell 24–30 by 64–72 μ; oogonium 40–53 by 52–64 μ; oospore 38–48 by 40–60 μ; androsporangium 16–20 by 15–30 μ; dwarf male stipe 9–12 by 28–40 μ; antheridium 7–8 by 8–14 μ.

TYPE LOCALITY: British Columbia.
DISTRIBUTION: British Columbia.
PLATE 30. *f. 478.*

129. **Oedogonium nebraskense** Ohashi, Bot. Gaz. **82**: 213. 1926.

Dioecious, nannandrous, gynandrosporous; oogonia 1–4, flask-shaped or obovoid, pore supramedian; oospore subspheric or ovoid, not quite filling oogonium; outer layer of spore-wall smooth, middle layer punctate, inner layer smooth; androsporangia 1–4; basal cell elongate; terminal cell attenuate-obtuse; dwarf male curved, on suffultory cell, antheridia exterior, 1–4; vegetative cell slightly capitellate; filament 20–41(50)-celled; vegetative cell, terminal 9–12 by 170–305 μ, median 20–27 by 57–160 μ, basal 22–35 by 79–230 μ; suffultory cell 41–58 by 93–130 μ; oogonium 60–67 by 70–79 μ; oospore 53–64 by 60–76 μ; androsporangium 20–25 by 22–40 μ; dwarf male stipe 12–19 by 47–68 μ; antheridium 9–13 by 17–20 μ.

TYPE LOCALITY: Lincoln, Nebraska.
DISTRIBUTION: North Carolina, Iowa, Nebraska, Oklahoma, Wyoming.
PLATE 30. *f. 468–470.*

129*a*. **Oedogonium nebraskense** var. **Whitfordii** Tiffany, var. nov. *Oedogonium nebraskense* L. Whitford, Jour. Elisha Mitchell Soc. **52**: 94. 1936. Not *O. nebraskense* Ohashi. 1926. Larger; oogonium 74–78 by 105–109 μ; oospore 55–65 by 65–75 μ. TYPE LOCALITY: North Carolina. DISTRIBUTION: North Carolina.

130. **Oedogonium hystricinum** Transeau & Tiff. Ohio Jour. Sci. **19**: 240. 1919.

Dioecious, nannandrous, idioandrosporous; oogonium 1, globose or somewhat obovoid, pore median; oospore globose to subglobose, nearly filling the oogonium; outer spore-wall densely covered with spines; suffultory cell swollen; androsporangia 3–6; terminal cell obtuse; basal cell elongate; dwarf male nearly straight, resting on the suffultory cell, antheridium exterior, 1; female vegetative cell 8–15 by 42–100 μ, male 6–9 by 50–67 μ; suffultory cell 16–19 by 42–70 μ; oogonium 30–40 by 36–53 μ; oospore (including spines) 23–38 by 28–43 μ; androsporangium 6–8 by 8–15 μ; dwarf male stipe 6–10 by 20–32 μ; antheridium 5–6 by 6–10 μ.

TYPE LOCALITY: Charleston, Illinois.
DISTRIBUTION: Massachusetts, Michigan, Illinois, Iowa, Florida; Puerto Rico.
PLATE 30. *f. 481, 482.*

131. **Oedogonium Aster** Wittr. Bot. Notiser **1872**: 5. 1872.

Dioecious, nannandrous; oogonium 1, subdepressed-globose, pore median; oospore subdepressed-globose or subglobose, not completely filling oogonium; outer layer of spore-wall

echinate; suffultory cell sometimes a little swollen; terminal cell obtuse; dwarf male a little curved, on suffultory cell, stipe sometimes 2-celled, antheridia exterior, 1 or 2; vegetative cell 7–13 by 50–110 μ; oogonium 33–37 by 30–39 μ; oospore (with spines) 29–32 by 25–30 μ; dwarf male stipe 6–7 by 20–25 μ; antheridium 5–6 by 7–8 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Illinois, Oklahoma.
PLATE 30. *f. 486*.

132. **Oedogonium pungens** Hirn, Acta Soc. Sci. Fenn. **27**: 199. 1900.

Dioecious, nannandrous, gynandrosporous; oogonium 1, subdepressed-globose (or nearly subglobose), pore median or a little above median; oospore subglobose, almost filling oogonium; outer spore-wall echinate; androsporangium 1–?, hypogynous; dwarf male a little curved, on suffultory cell, antheridia exterior, 1 or 2; vegetative cell 12–16 by 50–128 μ; oogonium 40–48 by 40–50 μ; oospore (with spines) 37–44 by 35–43 μ; androsporangium 14–16 by 10–15 μ; dwarf male stipe 9–12 by 20–30 μ; antheridium 6–7 by 8–12 μ.

TYPE LOCALITY: South Carolina.
DISTRIBUTION: Massachusetts, Illinois, North Carolina, South Carolina, Oklahoma.
PLATE 30. *f. 483, 484*.

133. **Oedogonium echinospermum** A. Br.; Kütz. Sp. Alg. 366. 1849.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonium 1, ellipsoid-globose or subglobose, pore median; oospore globose, quite filling oogonium; outer layer of spore-wall echinate; androsporangia 1–5; dwarf male a little curved, on suffultory cell, antheridia exterior, 1 or 2; vegetative cell 18–30 by 45–130 μ; oogonium 39–50 by 41–57 μ; oospore (with spines) 38–47 by 38–49 μ; androsporangium 21–25 by 9–15 μ; dwarf male stipe 10–15 by 26–35 μ; antheridium 6–12 by 6–15 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Michigan, Illinois, Alabama, Mississippi, Oklahoma; British Columbia.
PLATE 31. *f. 487*.

133*a*. **Oedogonium echinospermum** var. **horridum** Hirn, Acta Soc. Sci. Fenn. **27**: 201. 1900. *Oedogonium echinospermum* var. Wolle, Fresh-w. Alg. U. S. 86. 1887. Larger, with longer and denser spines; antheridium pluricellular. TYPE LOCALITY: Florida. DISTRIBUTION: Florida. PLATE 31. *f. 488*.

134. **Oedogonium Hystrix** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 133. 1870.

Dioecious, nannandrous, gynandrosporous (or possibly idioandrosporous); oogonium 1, ellipsoid, pore median or occasionally below median; oospore ellipsoid, nearly filling oogonium; outer spore-wall echinate; androsporangia 1–3; terminal cell obtuse; dwarf male slightly curved, on suffultory cell; antheridium exterior, 1; vegetative cell 17–28 by 30–120 μ; oogonium 38–48 by 45–65 μ; oospore 37–46 by 43–55 μ; androsporangium 16–18 by 13–18 μ; dwarf male stipe 10–11 by 22–25 μ; antheridium 6–8 by 9–14 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Pennsylvania; British Columbia.
PLATE 31. *f. 489*.

135. **Oedogonium spiripennatum** Jao, Rhodora **36**: 210. 1934.

Dioecious, nannandrous, idioandrosporous (?); oogonium solitary, subglobose to obovoid-globose, pore median; oospore globose or subglobose, filling the oogonium; spore-wall of three layers, the median and inner smooth, the outer finely granulate, with 5–7 spiral, toothed, membranous-winged ribs uniting at the poles, the polar axis always placed in a transverse position, never parallel with the filament; suffultory cell swollen; dwarf male a little curved, on the suffultory cell, rarely on the oogonium or near the suffultory cell; stipe cell 1–2; an-

theridium 1, exterior; sperm 1; lower vegetative cell of the filament generally more slender than the upper; basal cell slightly enlarged, with lobed holdfast; terminal cell apically obtuse; vegetative cell 16–22 by 44–90 μ; suffultory cell 25–32 by 64–80 μ; oogonium 48–58 by 48–61 μ; oospore 44–54 by 41–51 μ; dwarf male stipe: upper cell 6–8 by 38–48 μ, lower cell 9–13 by 35–45 μ; antheridium 6–8 by 38–48 μ; basal cell 19–20 by 60–61 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATES 32. *f. 504;* 36. *f. 557.*

136. **Oedogonium exospirale** Tiff. Ohio Jour. Sci. **24**: 184. 1924.

Dioecious, nannandrous, idioandrosporous; oogonium 1 (rarely 2), subglobose or obovoid-globose (rarely subhexagonal), pore median; oospore globose or subglobose, nearly filling the oogonium; spore-wall of two layers, the outer marked by 5–8 spiral ribs uniting at the poles, the polar axis always placed in a transverse position, never parallel with the filament, the inner layer smooth; suffultory cell swollen; androsporangia 1–6; basal cell elongate; dwarf male a little curved, situated on the suffultory cell, with exterior antheridia 1–3; vegetative cell 8–15 by 60–88 μ; suffultory cell 16–28 by 60–88 μ; oogonium 40–44 by 44–48 μ; oospore 32–38 by 38–40 μ; androsporangium 12–16 by 14–20 μ; dwarf male stipe 14–16 by 30–40 μ; antheridium 8–12 by 14–16 μ.

TYPE LOCALITY: Spirit Lake, Iowa.
DISTRIBUTION: Iowa, Ohio, Mississippi; Puerto Rico.
PLATE 31. *f. 501–503.*

137. **Oedogonium illinoiense** Transeau, Am. Jour. Bot. 1: 299. 1914.

Dioecious, nannandrous, gynandrosporous; oogonium 1, subglobose to obovoid-globose, pore median; oospore globose or subglobose, nearly filling oogonium; outer spore-wall with 4–7 spiral ribs, uniting at poles, the polar axis always transverse to axis of filament; suffultory cell enlarged; androsporangia 1–5; basal cell elongate; dwarf male slightly curved, on suffultory cell; antheridia exterior, 1–4; vegetative cell 13–18 by 80–140 μ; suffultory cell 32–40 by 50–80 μ; oogonium 51–60 by 60–70 μ; oospore 45–56 by 48–66 μ; androsporangium 13–17 by 17–22 μ; dwarf male stipe 14–17 by 37–57 μ; antheridium 9–12 by 15–23 μ.

TYPE LOCALITY: Lerna, Illinois.
DISTRIBUTION: Illinois, Kentucky, Mississippi, Florida.
PLATE 31. *f. 494–496.*

137*a*. **Oedogonium illinoiense** var. **oklahomense** Taft, Bull. Torrey Club **62**: 287. 1935. Idioandrosporous; outer spore-wall with 4–6 spiral ribs, not united at the poles; basal cell elongate; antheridium 1, exterior; vegetative cell 10–20 by 73–125 μ; suffultory cell 26–34 by 69–75 μ; oogonium 49–56 by 60–65 μ; oospore 43–46 by 43–46 μ; dwarf male stipe 11–13 by 38–46 μ; antheridium 7–9 by 12–13 μ. TYPE LOCALITY: Oklahoma. DISTRIBUTION: Oklahoma. PLATE 31. *f. 497–499.*

138. **Oedogonium acutum** (W. & G. West) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium spirale var. *acutum* W. & G. West, Trans. Linn. Soc. II. **6**: 128. 1902.

Dioecious, nannandrous, idioandrosporous; oogonium 1, subglobose to ovoid-globose, pore median; oospore globose, not filling oogonium; outer layer of wall with 4–7 spiral costae, anastomosing, irregularly and acutely dentate, inner layer smooth; antheridium exterior, single; vegetative cell 20–26 by 70–106 μ; oogonium 46–56 by 54–60 μ; oospore 37–45 by 37–45 μ; dwarf male stipe 9–12 by 34–44 μ; antheridium 8–9 by 14–18 μ.

TYPE LOCALITY: Ceylon.
DISTRIBUTION: Mississippi.
PLATE 31. *f. 493.*

139. **Oedogonium spirale** Hirn, Acta Soc. Sci. Fenn. **27**: 201. 1900.

Dioecious, nannandrous, idioandrosporous; oogonium 1, subglobose or obovoid-globose, pore median; oospore globose or subglobose, not filling oogonium; spore-wall double, the outer layer with 4–7 spiral ribs, anastomosing, united at the poles, the inner smooth; androsporangia 1–3; basal cell elongate; dwarf male a little curved, near oogonium, antheridium exterior, 1; vegetative cell 20–33 by 40–130 μ; oogonium 52–60 by 52–60 μ; oospore 46–56 by 46–56 μ; androsporangium 17–22 by 11–14 μ; dwarf male stipe 11–16 by 41–59 μ; antheridium 10–11 by 18–20 μ.

TYPE LOCALITY: Java.
DISTRIBUTION: Florida.
PLATE 31. *f. 490–492*.

140. **Oedogonium depressum** Pringsh. Jahrb. Wiss. Bot. **1**: 69. 1857.

Dioecious, nannandrous, gynandrosporous; oogonium 1 (rarely 2), globose to subglobose, pore median; oospore depressed-globose, not filling oogonium, its wall smooth; androsporangia 2; dwarf male oblong-obovoid, on oogonium, antheridium interior; vegetative cell 8–9 by 25–54 μ; oogonium 28 by 26 μ; oospore 23 by 17–18 μ; dwarf male 4–5 by 14–16 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Michigan; Greenland.
PLATE 32. *f. 507*.

141. **Oedogonium Braunii** Kütz. Sp. Alg. 366. 1849.

Oedogonium calcareum var. *gaditanum* Lewin, Bih. Sv. Vet.-Akad. Handl. **14**[1]: 18. 1888.

Dioecious, nannandrous, gynandrosporous; oogonium 1, ovoid to subglobose, pore median; oospore globose, not filling oogonium; spore-wall smooth; androsporangia 1 or 2; basal cell elongate; terminal cell apically obtuse; dwarf male usually on suffultory cell, stipe somewhat curved; antheridium exterior, 1; vegetative cell 13–15 by 25–60 μ; suffultory cell 16–20 by 28–50 μ; oogonium 30–37 by 33–43 μ; oospore 27–33 by 27–33 μ; androsporangium 13–15 by 11–12 μ; dwarf male stipe 7–12 by 20–28 μ: antheridium 5–8 by 9–10 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New Jersey, Pennsylvania, Michigan, Illinois, Iowa, North Carolina, Oklahoma; British Columbia.
PLATE 32. *f. 505*.

142. **Oedogonium gallicum** Hirn, Acta Soc. Sci. Fenn. **27**: 197. 1900.

Oedogonium flavescens var. *minus* Taft, Bull. Torrey Club **62**: 285. 1935.

Dioecious, nannandrous, idioandrosporous; oogonia 1 or 2, globose to subhexagonally globose, pore about median; oospore of same form as oogonium and quite filling it; spore-wall smooth; dwarf male suberect, on suffultory cell (rarely oogonium), antheridia exterior, 1 or 2; vegetative cell 17–22 by 51–120 μ; oogonium 39–48 by 44–54 μ; oospore 36–46 by 39–44 μ; dwarf male stipe 11–16 by 26–45 μ; antheridium 8–10 by 7–13 μ; androsporangium 16–23 by 10–20 μ.

TYPE LOCALITY: France.
DISTRIBUTION: Michigan, Kentucky, Oklahoma.
PLATE 32. *f. 511, 512, 516*.

143. **Oedogonium flavescens** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 127. 1870.

? *Vesiculifera flavescens* Hassall, Hist. Brit. Fresh-w. Algae **1**: 206. 1845.
Oedogonium flavescens var. *gynandrosporum* Hirn, Acta Soc. Faun. Fl. Fenn. **11**[6]: 16. 1895.

Dioecious, nannandrous, idioandrosporous or gynandrosporous; oogonium 1, ellipsoid-globose to subglobose, pore median; oospore globose, not quite filling oogonium; spore-wall smooth; androsporangia 1–9; dwarf male somewhat curved, on the suffultory cell; antheridia

1 or 2; vegetative cell 18–23 by 72-140 μ; oogonium 49–52 by 51–60 μ; oospore 45-49 by 45–49 μ; androsporangium 17–20 by 8–18 μ; dwarf male stipe 11–12 by 36–45 μ; antheridium 9–10 by 15–20 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Ohio, Indiana, Iowa, Minnesota, Alabama, Mississippi.
PLATE 32. *f. 517*.

144. **Oedogonium Zehneri** (Tiff.) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium Braunii var. *Zehneri* Tiff. Bot. Gaz. **83**: 204. 1927.

Dioecious, nannandrous, gynandrosporous; oogonium 1, ovoid, pore median; oospore ovoid, not filling oogonium lengthwise, its wall smooth; androsporangia 1 or 2, subepigynous; basal cell elongate; dwarf male usually on suffultory cell, stipe of 1–4 cells; antheridium 1, exterior; vegetative cell 12–24 by 34–72 μ; suffultory cell 21–32 by 48–52 μ; oogonium 40–50 by 48–60 μ; oospore 34–44 by 36–50 μ; dwarf male stipe 8–10 by 16–24 μ; antheridium 7–8 by 8–12 μ.

TYPE LOCALITY: Vincennes, Indiana.
DISTRIBUTION: Indiana, North Carolina.
PLATE 32. *f. 506*.

145. **Oedogonium angulosum** Hallas, Bot. Tidssk. **26**: 402. 1905.

Oedogonium sexangulare var. *angulosum* Hirn, Acta Soc. Sci. Fenn. **34**[3]: 21. 1906.

Dioecious, nannandrous, gynandrosporous; oogonium single, sexangular-ellipsoid, pore median or a little above median; oospore sexangular-ellipsoid, nearly filling oogonium, its wall smooth; androsporangia 1–3; dwarf male on suffultory cell or rarely scattered, stipe of 1–3 cells; antheridium exterior; vegetative cell 10–14 by 15–60 μ; oogonium 19–30 by 30–42 μ; oospore 17–28 by 21–30 μ; androsporangium 10–12 by 12–20 μ; dwarf male stipe 6–10 by 18–24 μ; antheridium 6–7 by 7–8 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Alabama.
PLATE 32. *f. 509, 510*.

146. **Oedogonium sexangulare** Cleve; Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 131. 1870.

Dioecious, nannandrous, gynandrosporous; oogonium 1 (rarely 2), sexangular-ellipsoid, pore a little above median; oospore same form as oogonium and nearly filling it; spore-wall smooth; suffultory cell sometimes slightly tumid; androsporangia 1–3; dwarf male on suffultory cell, a little curved, stipe of 2–3 cells; antheridium exterior, 1; vegetative cell 9–16 by 30–110 μ; oogonium 29–33 by 33–39 μ; oospore 27–31 by 31–36 μ; androsporangium 13–14 by 10–14 μ; dwarf male stipe 7–9 by 21–30 μ; antheridium 6–7 by 9–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Maine, Massachusetts, New York, Pennsylvania, Michigan, Indiana, Kentucky, Mississippi, Louisiana, Florida.
PLATE 32. *f. 514*.

147. **Oedogonium subsexangulare** Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium sexangulare var. *majus* Wille, Forh. Vid.-Selsk. Christiania **1880**[11]: 68. 1880.

Dioecious, nannandrous, gynandrosporous; oogonium 1, sexangular-ellipsoid, pore median; oospore similar in shape to oogonium and nearly filling it, its wall smooth; suffultory cell slightly enlarged; androsporangia 1 or 2; dwarf male on suffultory cell, antheridium exterior, solitary; vegetative cell 15–23 by 30–68 μ; oogonium 36–42(48) by (36)41–45 μ; oospore 34–40 by 39–

43 μ; androsporangium 14–18 by 8–10 μ; dwarf male stipe 7–9 by 18–30 μ; antheridium 6–8 by 6–10 μ.

TYPE LOCALITY: Norway.
DISTRIBUTION: Massachusetts, Alabama, Mississippi.
PLATE 32. *f. 508*.

148. **Oedogonium magnum** (Ackley) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium multisporum var. *magnum* Ackley, Trans. Am. Micr. Soc. **48**: 305. 1929.

Dioecious, nannandrous, idioandrosporous; oogonium 1, subglobose, pore supramedian (rarely median); oospore globose to subglobose to depressed-globose, its wall smooth; androsporangia 1 or 2; dwarf male on or near oogonium or scattered; vegetative cell 14–18 by 30–90 μ; suffultory cell 17–21 by 28–90 μ; oogonium 40–43 by 33–38 μ; oospore 38–41 by 32–36 μ; androsporangium 17–18 by 16–22 μ; dwarf male stipe 12–14(20) by 24–26(29) μ; antheridium 8–10(12) by 8–10 μ.

TYPE LOCALITY: Muskegon Lake, Michigan.
DISTRIBUTION: Michigan.
PLATE 32. *f. 513*.

149. **Oedogonium excentriporum** (Jao) Tiffany, sp. nov.

Oedogonium hystricinum var. *excentriporum* Jao, Rhodora **36**: 205. 1934.

Dioecious, nannandrous, idioandrosporous (?); oogonium solitary, obovoid-globose, pore supramedian; oospore subglobose to globose, filling the oogonium or rarely nearly filling it; spore-wall of three layers, the median and inner smooth, the outer densely echinate; suffultory cell tumid; dwarf male on suffultory cell, stipe 1–3-celled; antheridium 1, exterior; basal cell sometimes a little tumid, not elongate; terminal cell obtuse; vegetative cell 6–8 by 40–94 μ; suffultory cell 12–20 by 47–54 μ; oogonium 32–35 by 38–48 μ; oospore 27–32 by 32–35 μ; dwarf male: antheridium 5–6 by 5–12 μ, stipe 5–7 by 10–21 μ, upper cell 3–7 by 9–26 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 30. *f. 479, 480*.

150. **Oedogonium stellatum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 129. 1870.

? *Oedogonium spinospermum* Reinsch, Contr. Alg. Fung. **1**: 81. 1875.

Dioecious, nannandrous, gynandrosporous; oogonia 1–3, obovoid-globose, pore superior; oospore globose, quite filling oogonium; outer spore-wall with 4–7 somewhat spirally arranged ribs, appearing definitely dentate on the margin, sometimes anastomosate; androsporangia 1–3, usually subepigynous; basal cell elongate; terminal cell slender, subhyaline, apically obtuse; dwarf male suberect, on suffultory cell; antheridia 1 or 2; vegetative cell 15–35 by 40–225 μ; oogonium 51–64 by 56–70 μ; oospore (with ribs) 50–58 by 50–58 μ; androsporangium 14–19 by 13–20 μ; dwarf male stipe 11–13 by 45–52 μ; antheridium 6–9 by 8–13 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Alabama, Florida.
PLATE 34. *f. 536*.

151. **Oedogonium incertum** Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium cyathigerum f. *americanum* Wolle, Fresh-w. Algae U. S. 77. 1887.

Dioecious, nannandrous, idioandrosporous; oogonium 1, subovoid to somewhat ellipsoid, pore superior; oospore similar in shape to oogonium, its median layer longitudinally costate; dwarf male on oogonium; vegetative cell 17–21 by 22–62 μ; oogonium 45–50 by 55–63 μ; oospore 39–40 by 44–46 μ; dwarf male 12–15 by 50–54 μ.

TYPE LOCALITY: Pennsylvania.
DISTRIBUTION: Pennsylvania.

152. **Oedogonium cyathigerum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 131. 1870.

Oedogonium cyathigerum var. *rumelicum* Istv. Term. Füz. **13**: 77. 1890.
Oedogonium ornatum Hirn, Oefv. Finska Vet.-Soc. Förh. **38**: 20. 1896.

Dioecious, nannandrous, idioandrosporous; oogonia 1–3, subovoid or quadrangular-ellipsoid, pore superior; oospore same form as oogonium, filling it; outer layer of spore-wall smooth, the median with 16–25 longitudinal, continuous, rarely anastomosing, often curved, ridges, the inner smooth; basal cell elongate; terminal cell, often an oogonium, obtuse; dwarf male goblet-shaped, curved, on the suffultory cell or oogonium; antheridium interior; vegetative cell 21–30 by 40–300 μ; suffultory cell 42–48 by 75–110 μ; oogonium 57–66 by 70–100 μ; oospore 51–62 by 60–75 μ; androsporangium 23–30 by 12–30 μ; dwarf male cell 12–15 by 50–58 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Michigan, Indiana, Illinois, Iowa, Florida, Mississippi, Oklahoma; Puerto Rico.
PLATE 35. *f. 541, 542.*

152*a*. **Oedogonium cyathigerum** f. **ornatum** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **27**: 254. 1900. *Oedogonium cyathigerum* var. *ornatum* Wittr. Bot. Notiser **1878**: 134. 1878. Idioandrosporous; dwarf males elongate; vegetative cell 21–30 by 60–270 μ; suffultory cell 39–48 by 60–116 μ; oogonium 56–65 by 69–102 μ; oospore 54–60 by 65–83 μ; androsporangium 21–27 by 13–27 μ; dwarf male 12–16 by 60–75 μ. TYPE LOCALITY: Vera Cruz, Mexico. DISTRIBUTION: Vera Cruz. PLATE 35. *f. 544–546.*

152*b*. **Oedogonium cyathigerum** var. **ellipticum** Magnus & Wille; Wille, Bih. Sv. Vet.-Akad. Handl. 8^{18}: 40. 1884. Oospore frequently not filling oogonium, quadrangular-ellipsoid or nearly ellipsoid or rarely subglobose; gynandrosporous, androsporangia 1–6; vegetative cell 19–30 by 30–132 μ; suffultory cell 26–46 by 40–125 μ; oogonium 50–66 by (59) 68–94 μ; oospore 48–65 by 45–66 (73) μ; androsporangium 23–26 by 14–19 μ; dwarf male 13–18 by 43–59 μ. TYPE LOCALITY: Uruguay. DISTRIBUTION: Ohio, Oklahoma. PLATE 35. *f. 543.*

153. **Oedogonium perfectum** (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium cyathigerum f. *perfectum* Hirn, Acta Soc. Sci. Fenn. **27**: 254. 1900.

Dioecious, nannandrous, idioandrosporous; oogonia 1–4, subovoid to quadrangular-ellipsoid, pore superior; oospore of same form as oogonium and filling it; outer layer of wall smooth, middle layer with 16–24 longitudinal, continuous, sometimes anastomosing, often curved ridges, inner layer smooth; androsporangia to 23-seriate; dwarf male goblet-shaped, curved, on suffultory cell or oogonium, antheridium interior; basal cell elongate; vegetative cell 22–35 by 65–350 μ; suffultory cell 37–56 by 56–152 μ; oogonium 65–85 by 72–111 μ; oospore 61–80 by 65–85 μ; androsporangium 21–30 by 15–30 μ; dwarf male 12–16 by 55–80 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Ohio, Indiana, Mississippi; Puerto Rico.
PLATE 35. *f. 547, 548.*

154. **Oedogonium Wolleanum** Wittr. Bot. Notiser **1878**: 137. 1878.

Oedogonium apophysatum Rab. Alg. Sachs. *291.* 1853. Not *O. apophysatum* A. Br. 1849.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonia 1–4, subobovoid or quadrangular-ellipsoid, pore superior, wall with raised longitudinal lines on the inner surface; oospore of same form as oogonium, quite filling it; outer layer of spore-wall with 25–35 entire longitudinal ribs, rarely anastomosing, inner layer smooth; androsporangia 1–3, often sub-epigynous or scattered in the upper part of the filament; basal cell elongate; terminal cell, sometimes an oogonium, short-acute or acuminate; dwarf male on suffultory cell, stipe slightly curved; antheridia exterior, 1–3; vegetative cell 21–30 by 65–235 μ; suffultory cell 45–56 by 68–110 μ; oogonium 58–68 by 69–89 μ; oospore 56–66 by 65–83 μ; androsporangium 21–30 by 18–25 μ; dwarf male stipe 15–24 by 54–60 μ; antheridium 9–14 by 7–11 μ.

TYPE LOCALITY: Pennsylvania.
DISTRIBUTION: Massachusetts, Connecticut, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Minnesota, Florida; Puerto Rico; Greenland.
PLATE 36. *f. 549, 550.*

154*a*. **Oedogonium Wolleanum** var. **concinnum** Hirn, Acta Soc. Sci. Fenn. **27**: 222. 1900. Smaller; oospore not quite filling oogonium; ribs of outer layer of spore-wall finely crenulate; vegetative cell 19–27 by 80–180 μ; suffultory cell 41–52 by 72–150 μ; oogonium 54–63 by 63–93 μ; oospore 52–61 by 62–74 μ; dwarf male stipe 16–20 by 50–60 μ; antheridium 10–13 by 10–15 μ. TYPE LOCALITY: Minnesota. DISTRIBUTION: Minnesota. PLATE 36. *f. 551*.

155. **Oedogonium striatum** Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium Wolleanum var. *insigne* Nordst.; Wittr. & Nordst. Algae Exsicc. *207*. 1879; Bot. Notiser **1879**: 23. 1879.
Oedogonium Wolleanum f. *insigne* Hirn, Acta Soc. Sci. Fenn. **27**: 222. 1900.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonia 1–10, subobovoid or somewhat ellipsoid, pore superior, wall with raised longitudinal lines on the inner surface; oospore of same form as oogonium, quite filling it, outer layer of spore-wall with 35–40 entire longitudinal ribs, inner layer smooth; androsporangia to 10–seriate, often subepigynous or scattered; basal cell elongate; dwarf male on suffultory cell, stipe slightly curved, antheridia exterior, 1–4; vegetative cell 18–36 by 53–250 μ; suffultory cell 57–66 by 100–150 μ; oogonium 67–80 by 78–92 μ; oospore 64–76 by 74–90 μ; androsporangium 19–30 by 18–30 μ; dwarf male stipe 18–24 by 54–68 μ; antheridium 12–14 by 10–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New Jersey.
PLATE 36. *f. 552, 553*.

156. **Oedogonium Donnellii** Wolle, Bull. Torrey Club **7**: 48. 1880; Hirn, Acta Soc. Sci. Fenn. **27**: 206. 1900.

Dioecious, nannandrous, idioandrosporous; oogonium 1 (rarely 2), obovoid-globose, pore superior; oospore globose, not filling oogonium; outer layer of spore-wall echinate, spines spirally arranged, spirals 5–7, anastomosing; androsporangia 4–10; dwarf male a little curved, on suffultory cell or rarely on oogonium; antheridia exterior, 1 or 2–?; vegetative cell 41–59 by 54–175 μ; oogonium 63–78 by 70–93 μ; oospore (with spines) 60–70 by 60–70 μ; androsporangium 40–45 by 10–12 μ; dwarf male stipe 16–21 by 63–74 μ; antheridium 14–15 by 8–22 μ.

TYPE LOCALITY: Florida.
DISTRIBUTION: Florida.
PLATE 34. *f. 537*.

157. **Oedogonium armigerum** Hirn, Acta Soc. Sci. Fenn. **27**: 203. 1900.

? *Oedogonium echinatum* H. C. Wood; Wolle, Fresh-w. Algae U. S. 86. 1887. Not *O. echinatum* Wittr. 1878.

Dioecious, nannandrous; oogonium 1, subglobose, pore superior; oospore globose, nearly filling oogonium; outer layer of spore-wall echinate; dwarf male curved, on suffultory cell, stipe sometimes 2–4-celled; antheridia exterior, 1 or 2; suffultory cell sometimes tumid; vegetative cell 9–13 by 36–100 μ; oogonium 29–38 by 30–40 μ; oospore 26–30 by 26–29 μ; dwarf male, lower cell 7–8 by 20–24 μ, upper cell 4–6 by 21–30 μ; antheridium 5–6 by 7–8 μ; basal cell 9–10 by 45–47 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Indiana, Florida, Oklahoma.
PLATE 30. *f. 485*.

158. **Oedogonium echinatum** (H. C. Wood) Wittr. Bot. Notiser **1878**: 137. 1878.

Androgynia echinata H. C. Wood, Fresh-w. Algae N. Am. 198. 1873.

Dioecious, nannandrous; oogonium (?) 1, globose, usually depressed, pore superior; oospore globose, distending oogonium; outer layer of spore-wall echinate; dwarf male suberect, near

oogonium, antheridium exterior (?), 1; vegetative cell 8–13 by 50–138 μ; oogonium 35–36 by 35–36 μ; oospore (without echinations) 25–26 by 25–26 μ.

TYPE LOCALITY: Pennsylvania.
DISTRIBUTION: Pennsylvania.
PLATE 32. *f. 515*.

159. **Oedogonium concatenatum** (Hassall) Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 25. 1874.

Vesiculifera concatenata Hassall, Hist. Brit. Fresh-w. Algae **1**: 201. 1845.
Oedogonium apophysatum Pringsh. Jahrb. Wiss. Bot. **1**: 71. 1857. Not *O. apophysatum* A. Br. 1849.
Oedogonium concatenatum var. *lagenarioides* Filar. Math. Term. Közlem **27**: 785. 1901.

Dioecious, nannandrous, gynandrosporous; oogonia 1–6, subovoid or quadrangular-ellipsoid, pore superior; oospore of same form as oogonium, nearly filling it; outer layer of spore-wall smooth, the middle with pits more or less distinctly arranged in 30–35 longitudinal series, the inner wall smooth; suffultory cell swollen; androsporangia 1–4; basal cell elongate; terminal cell obtuse; dwarf male curved, on suffultory cell; antheridia exterior, 1–4; vegetative cell 25–40 by 75–400 μ; suffultory cell 50–62 by 88–155 μ; oogonium 63–83 by 76–105 μ; oospore 60–75 by 67–95 μ; androsporangium 25–28 by 15–36 μ; dwarf male stipe 17–25 by 50–75 μ; antheridium 13–15 by 12–25 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New York, New Jersey, Pennsylvania, Michigan, Indiana, Illinois, Iowa, Oklahoma; British Columbia; Alaska.
PLATE 34. *f. 538*.

159*a*. **Oedogonium concatenatum** var. **superornatum** Tiffany, var. nov. *Oedogonium concatenatum* Skuja, Acta Horti Bot. Univ. Latv. **4**: 32. 1930. Not *O. concatenatum* Wittr. 1874. Smaller; oospore ellipsoid to globose; longitudinally arranged pits in 40–62 series; vegetative cell (19) 25–45 by 64–160 μ; suffultory cell 51–61 by 115–134 μ; oogonium 56–77 by 68–112 μ; oospore 57–74 by 64–83 μ; androsporangium 27–32 by 12–32 μ; dwarf male stipe 16–22 by 52–73 μ; antheridium 9–13 by 11–22 μ. TYPE LOCALITY: Woods Hole, Massachusetts. DISTRIBUTION: Massachusetts.

159*b*. **Oedogonium concatenatum** var. **regulare** Taft, Bull. Torrey Club. **62**: 284. 1935. Oogonium single, subovoid to quadrangularly ellipsoid; oospore of the same form as the oogonium; median spore-wall with concentrically arranged pits; vegetative cell 23–26 by 89–142 μ; suffultory cell 53–59 by 105 μ; oogonium 66–69 by 99–106 μ; oospore 63–68 by 83–86 μ; androsporangium 32 by 32 μ; dwarf male stipe 16–20 by 57–70 μ; antheridium 12–15 by 8–16 μ. TYPE LOCALITY: Oklahoma. DISTRIBUTION: Oklahoma. PLATE 35. *f. 540*.

159*c*. **Oedogonium concatenatum** var. **Hutchinsiae** (Wittr.) Tiffany, n. var. *Oedogonium Hutchinsiae* Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 42. 1874. *Oedogonium concatenatum* f. *Hutchinsiae* Hirn, Acta Soc. Sci. Fenn. **27**: 225. 1900. A little smaller; oospore more nearly globose, the pits of the middle layer of the spore-wall not arranged in evident longitudinal series; vegetative cell 26–35 by 75–210 μ; suffultory cell 37–50 by 65–200 μ; oogonium 52–75 by 67–95 μ; oospore 50–73 by 55–77 μ. TYPE LOCALITY: Ireland. DISTRIBUTION: Iowa. PLATE 35. *f. 539*.

160. **Oedogonium silvaticum** Hallas, Bot. Tidssk. **26**: 404. 1905.

Dioecious, nannandrous, gynandrosporous; oogonium 1, ellipsoid-globose, pore superior; oospore globose, not filling oogonium, its wall smooth; suffultory cell subtumid; dwarf male suberect, on suffultory cell, antheridium exterior; vegetative cell 12–15 by 65–120 μ; suffultory cell 20 by 60 μ; oogonium 37 by 50 μ; oospore 28 by 28 μ; androsporangium 7 by 17 μ; dwarf male stipe 11 by 39 μ; antheridium 7 by 7 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Florida.
PLATE 33. *f. 518*.

161. **Oedogonium Borisianum** (Le Clerc) Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 25. 1874.

Prolifera Borisiana Le Clerc, Mém. Mus. **3**: 475. 1817.
Vesiculifera aurea Hassall, Ann. Mag. Nat. Hist. **10**: 392. 1843.
Vesiculifera Borissii Hassall, Hist. Brit. Fresh-w. Algae **1**: 201. 1845.
Oedogonium apophysatum A. Br.; Kütz. Sp. Alg. 366. 1849.

Oedogonium setigerum Vaupell, Ann. Sci. Nat. IV. 11: 192. 1859.
? *Androgynia mirabilis* H. C. Wood, Fresh-w. Algae N. Am. 196. 1873.
Oedogonium birmanicum Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 24. 1874.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonia 1–5, obovoid or quadrangular-ellipsoid, pore superior; oospore ovoid to obovoid (often quadrangular-ovoid), not filling oogonium; spore-wall smooth; androsporangia 1–7, usually in the upper part of the filament; basal cell elongate; terminal cell, often an oogonium, broadly apiculate, obtuse, or sometimes setiferous; suffultory cell swollen; dwarf male somewhat curved, on suffultory cell; antheridia 2; vegetative cell sometimes capitellate, 15–23 by 45–140 μ; suffultory cell 31–38 by 50–92 μ; oogonium (33)40–50 by 55–90 μ; oospore 35–46 by 48–60 μ; androsporangium 16–19 by 15–23 μ; dwarf male stipe 12–18 by 35–47 μ; antheridium 7–10 by 11–16 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Pennsylvania, Michigan, Indiana, Illinois, Iowa, Florida, Alabama, Oklahoma, Utah, California; Puerto Rico; British Columbia.
PLATE 33. *f. 527*.

161*a*. **Oedogonium Borisianum** var. **minus** Tiff. & Smith; B. H. Smith, Proc. Ind. Acad. **41**: 190. 1932. Vegetative cell 14–15 by 37–48 μ; suffultory cell 30 by 52 μ; oogonium 33–55 by 33–55 μ; oospore 30–33 by 37–42 μ. TYPE LOCALITY: Indiana. DISTRIBUTION: Indiana.

162. **Oedogonium Westii** Tiff. & Br.; Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium Borisianum W. & G. West, Jour. Bot. **41**: 36. 1903. Not *O. Borisianum* Wittr. 1874.
Oedogonium Borisianum var. *Westii* Tiff. & Br.; Tiff. Ohio Jour. Sci. **29**: 74. 1929; Love & Rogers, Proc. Ind. Acad. **42**: 80. 1933.

Dioecious, nannandrous, gynandrosporous (?); oogonia 1–3, obovoid, pore superior; oospore ovoid to obovoid, not filling oogonium, its wall smooth; suffultory cell enlarged; dwarf male curved, on suffultory cell; antheridium 1; vegetative cell 17–35 by 81–180 μ; suffultory cell 31–48 by 105–168 μ; oogonium 53–68 by 67–99 μ; oospore 49–65 by 49–81 μ; antheridium 17–20 by 12–13 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Michigan, Indiana, Mississippi.
PLATE 33. *f. 528*.

163. **Oedogonium multisporum** H. C. Wood, Proc. Am. Phil. Soc. **11**: 141. 1869.

Androgynia multispora H. C. Wood, Fresh-w. Algae N. Am. 196. 1873.

Dioecious, nannandrous; oogonia 1–3, subovoid or subglobose, pore superior; oospore globose, nearly filling oogonium; spore-wall smooth; dwarf male a little curved or nearly erect, near or on oogonium, antheridia exterior, 1–4; vegetative cell 10–15 by 10–30 μ; oogonium 24–35 by 27–33 μ; oospore 27–30 by 24–30 μ; dwarf male stipe 10–11 by 26–30 μ; antheridium 7–9 by 7–9 μ.

TYPE LOCALITY: Philadelphia, Pennsylvania.
DISTRIBUTION: Pennsylvania, Michigan, Indiana, Illinois, Kentucky, Oklahoma.
PLATE 33. *f. 519, 520*.

164. **Oedogonium irregulare** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 128. 1870.

Dioecious, nannandrous; oogonium 1, globose or rarely subdepressed-globose, pore superior; oospore globose, completely filling oogonium; spore-wall smooth; dwarf male erect, on or near oogonium, antheridia exterior, 1–4; vegetative cell 15–20 by 40–80 μ; oogonium 37–45 by 36–47 μ; oospore 36–42 by 34–41 μ; dwarf male stipe 12–15 by 20–24 μ; antheridium 10–12 by 6–8 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Michigan, Illinois, Florida, Oklahoma; British Columbia.
PLATE 33. *f. 521*.

164*a*. **Oedogonium irregulare** var. **condensatum** (Hallas) Hirn, Acta Soc. Sci. Fenn. **34**[3]: 17. 1906. *Oedogonium condensatum* Hallas, Bot. Tidssk. **26**: 400. 1905. Idioandrosporous; oogonia rarely in two's; oospore depressed-globose; androsporangia 1–13; vegetative cell 14–18 by 20–80 μ; oogonium 35–46 by 28–38 μ; oospore 32–44 by 25–36 μ; androsporangium 12–14 by 7–21 μ; dwarf male stipe 11–13 by 21–24 μ; antheridium 9–10 by 7–12 μ. TYPE LOCALITY: Denmark. DISTRIBUTION: Michigan, Oklahoma. PLATE 33. *f. 522*.

165. **Oedogonium victoriense** G. West; A. D. Hardy, Vict. Nat. **23**: 22. 1906.

Dioecious, nannandrous, gynandrosporous; oogonium 1, ellipsoid-globose to ellipsoid-doliiform, pore superior; oospore exactly globose, not filling oogonium; spore-wall smooth; androsporangium 5–6-celled; dwarf male on suffultory cell, stipe curved, antheridia 2; suffultory cell broadly dilated; vegetative cell 25–29 by 50–87 μ; oogonium 49 by 57 μ; oospore 39 by 39 μ; androsporangium 25–26 by 4–8 μ; antheridium 7–8 by 4–5 μ.

TYPE LOCALITY: Victoria, Australia.
DISTRIBUTION: Iowa.
PLATE 34. *f. 535*.

166. **Oedogonium crassiusculum** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 132. 1870.

Dioecious, nannandrous, gynandrosporous; oogonia 1 or 2, globose-obovoid or subglobose, pore superior; oospore ellipsoid-globose or globose, spore-wall smooth and thick, quite filling oogonium; androsporangia 2–5; dwarf male suberect, on or near suffultory cell, antheridium exterior, 1–?; vegetative cell 27–30 by 95–105 μ; oogonium 54–60 by 60–75 μ; oospore 51–57 by 52–63 μ; androsporangium 26–28 by 10–18 μ; dwarf male 13 by 60 μ; antheridium 7–9 by 9–16 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, Connecticut, Ohio, Michigan, Iowa, Mississippi, Oklahoma.
PLATE 34. *f. 532*.

166*a*. **Oedogonium crassiusculum** var. **Arechavaletae** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **27**: 216. 1900. *Oedogonium Arechavaletae* Wittr.; Wittr. & Nordst. Algae Exsicc. *706*. 1886; Bot. Notiser **1886**: 133. 1886. Idioandrosporous; vegetative cell 21–35 by 32–110 μ; oogonium 39–54 by 42–65 μ; oospore 37–52 by 40–57 μ; dwarf male 14–16 by 40–57 μ; antheridium 9–14 by 10–16 μ. TYPE LOCALITY: Uruguay. DISTRIBUTION: Indiana, Kentucky, Oklahoma. PLATE 34. *f. 533*.

166*b*. **Oedogonium crassiusculum** var. **cataractum** (Wolle) Tiff. Oedog. Monog. 130. 1930. *Oedogonium cataractum* Wolle, Fresh-w. Algae U. S. 77. 1887. Idioandrosporous; oogonia 1 or 2, often terminal, obovoid-globose or subglobose or broadly ovoid, pore superior; oospore globose or obovoid-globose, nearly filling oogonium; androsporangia 1–6; dwarf male curved, on suffultory cell or below; vegetative cell 28–38 by 42–112 μ; oogonium 55–60 by 60–75 μ; oospore 50–55 by 50–60 μ; androsporangium 26–30 by 10–15 μ; dwarf male 10 by 65 μ. TYPE LOCALITY: Pike County, Pennsylvania. DISTRIBUTION: Pennsylvania, Ohio, Indiana, Iowa, Oklahoma. PLATE 34. *f. 534*.

167. **Oedogonium idioandrosporum** (Nordst. & Wittr.) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium crassiusculum var. *idioandrosporum* Nordst. & Wittr.; Wittr. & Nordst. Algae Exsicc. *208*. 1879; Bot. Notiser **1879**: 23. 1879.
Oedogonium crassiusculum C. H. S. Phyc. Bor. Am. *72*. 1895. Not *O. crassiusculum* Wittr. 1870.
Oedogonium crassipellitum G. West, Jour. Bot. **37**: 55. 1899.

Dioecious, nannandrous, idioandrosporous; oogonia 1–3, globose-obovoid to globose, pore superior; oospore ellipsoid-globose, ovoid, angular-globose (rarely globose), nearly filling the oogonium; spore-wall smooth, thick; androsporangia 1–4; dwarf male straight or slightly curved, on or near the suffultory cell; antheridia exterior, 1 or 2; vegetative cell 25–36 by 65–200 μ; oogonium 48–59 by 57–90 μ; oospore 42–57 by 50–66 μ; androsporangium 30–34 by 12–21 μ; dwarf male stipe 14–16 by 60–70 μ; antheridium 8–10 by 10–18 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Maine, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Michigan, Illinois, Iowa, Minnesota, South Dakota, Mississippi.
PLATE 33. *f. 523, 524*.

167*a*. **Oedogonium idioandrosporum** var. **minus** Tiff. Trans. Am. Micr. Soc. **55**: 4. 1936. *Oedogonium crassiusculum* var. *idioandrosporum* Jao, Rhodora **36**: 201. 1934. Not *O. crassiusculum*

var. *idioandrosporum* Nordst. & Wittr. 1879. Oogonia 1–4; oospore sometimes angular-globose with very thick wall; smaller in all dimensions; vegetative cell 19–32 by 60–103 μ; oogonium 42–54 by 45–60 μ; oospore 38–52 by 41–52 μ; androsporangium 20–26 by 8–26 μ; dwarf male stipe 9–15 by 43–56 μ; antheridium 8–10 by 8–20 μ; otherwise as in the species. TYPE LOCALITY: Woods Hole, Massachusetts. DISTRIBUTION: Massachusetts, Alabama. PLATE 33. *f. 525, 526.*

168. **Oedogonium contortum** Hallas, Bot. Tidssk. **26**: 399. 1905.

Dioecious, nannandrous, gynandrosporous; oogonium 1 (rarely 2), depressed-globose (rarely pyriform), operculate, division inframedian; oospore depressed (rarely globose), quite filling oogonium; spore-wall smooth; androsporangia 1–5, curved, hypogynous or rarely epigynous or scattered; dwarf male obovoid, unicellular, on oogonium; vegetative cell 5–7 by 20–60 μ; oogonium 23–35 by 16–35 μ; oospore 16–28 by 12–21 μ; androsporangium 5–7 by 7–14 μ; dwarf male 4 by 13 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: Florida.
PLATE 27. *f. 420.*

169. **Oedogonium longicolle** Nordst. Minneskr. Fys. Sällsk. Lund **7**: 20. 1878.

Dioecious, nannandrous; oogonia 1–7, pyriform, often elongate longitudinally, operculate, division median and narrow; oospore subdepressed-globose or subglobose, inflating oogonium medianly, not filling it longitudinally; spore-wall smooth; basal cell subhemispheric; dwarf male unicellular, obovoid, minute, on oogonium; vegetative cell 4–6 by 16–45 μ; oogonium 13–16 by 16–32 μ; oospore 12–15 by 10–16 μ; dwarf male 2 by 4 μ; basal cell 14 by 6 μ.

TYPE LOCALITY: Hawaii.
DISTRIBUTION: North Carolina, Florida.
PLATE 24. *f. 388, 389.*

170. **Oedogonium senegalense** (Nordst.) Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium longicolle var. *senegalense* Nordst. Acta Univ. Lund **16**[4]: 13. 1880.
Oedogonium longicolle var. *senegalense* f. *afghanicum* Schaars. Jour. Linn. Soc. **21**: 249. 1884.
? *Oedogonium delicatulum* Kütz.; Wolle, Fresh-w. Algae U. S. 93. 1887.

Dioecious, nannandrous; oogonia 1–5, pyriform, often elongate lengthwise, operculate, division median (rarely supramedian) and narrow; oospore subglobose to depressed-globose, sometimes inflating oogonium medianly but not filling it longitudinally, its wall smooth; basal cell subhemispheric; dwarf male unicellular, obovoid, minute, on oogonium, often lacking; vegetative cell 5–8 by 12–40 μ; oogonium 16–21 by 14–32 μ; oospore 14–20 by 11–19 μ; dwarf male 1–2 by 2–3 μ; basal cell 13–14 by 5–7 μ.

TYPE LOCALITY: Africa.
DISTRIBUTION: North Carolina, Oklahoma.
PLATE 24. *f. 381, 382.*

171. **Oedogonium Rothii** Pringsh. Jahrb. Wiss. Bot. **1**: 69. 1857.

? *Prolifera Rothii* Le Clerc, Mém. Mus. Paris **3**: 476. 1817.
Oedogonium cryptoporum var. *subdepressum* Wittr.; Wittr. & Nordst. Algae Exsicc. *507.* 1883; Bot. Notiser **1883**: 148. 1883.
Oedogonium cryptoporum var. *vulgare* f. *abbreviatum* Gutw. Nuova Notar. **8**: 126. 1897.

Dioecious, nannandrous, gynandrosporous; oogonia 1–3, subdepressed-globose, operculate, division median, narrow; oospore depressed-globose, almost filling oogonium; spore-wall smooth; androsporangia 1–4, subhypogynous, hypogynous, subepigynous, or scattered; vegetative cell 6–10 by 20–76 μ; oogonium 20–27 by 16–27 μ; oospore 17–25 by 14–20 μ; androsporangium 6–8 by 5–10 μ; dwarf male 4 by 11–12 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Florida, Oklahoma.
PLATE 24. *f. 380.*

172. **Oedogonium decipiens** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 126. 1870; Hirn, Acta Soc. Sci. Fenn. **27**: 266. 1900.

Oedogonium vesicatum De Bary, Ber. Verh. Nat. Ges. Freiburg 1: 224. 1856.
Oedogonium Rothii f. *majus* W. & G. West, Jour. Bot. **35**: 5. 1897.

Dioecious, nannandrous, gynandrosporous; oogonia 1–3, subdepressed-globose, operculate, division median, rather narrow; oospore subdepressed or depressed-globose, almost filling the oogonium; spore-wall smooth; suffultory cell not swollen; androsporangia 1–6, subepigynous, hypogynous, or scattered; dwarf male unicellular, usually on the oogonium; vegetative cell 9–12 by 28–80 μ; oogonium 30–38 by 27–40 μ; oospore 25–34 by 23–28 μ; androsporangium 9–10 by 8–15 μ; dwarf male 6–7 by 13–15 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: New Jersey, Michigan, Indiana, Iowa, Florida; Puerto Rico.
PLATE 24. *f. 383.*

172*a*. **Oedogonium decipiens** var. **dissimile** (Hirn) Tiffany, var. nov. *Oedogonium decipiens* f. *dissimile* Hirn, Acta Soc. Sci. Fenn. **27**: 267. 1900. Gynandrosporous; vegetative cells evidently capitellate, 8–14 by 20–65 μ; oogonium 28–35 by 23–38 μ; oospore 23–34 by 21–30 μ; androsporangium 8–9 by 6–10 μ; dwarf male 5–6 by 11–14 μ. TYPE LOCALITY: Brazil. DISTRIBUTION: Michigan, Indiana, Illinois; Puerto Rico. PLATE 24. *f. 384, 385.*

172*b*. **Oedogonium decipiens var. africanum** Tiff. Ohio Jour. Sci. **29**: 74. 1929. Smaller and idioandrosporous; vegetative cell 8–13 by 25–60 μ; oogonium 25–32 by 24–32 μ; oospore 24–30 by 23–28 μ; androsporangium 7–11 by 9–13 μ; dwarf male 6–7 by 9–12 μ. TYPE LOCALITY: Africa. DISTRIBUTION: Indiana. PLATE 24. *f. 386.*

173. **Oedogonium macrospermum** W. & G. West, Jour. Roy. Micr. Soc. **1897**: 472. 1897; Tiff. Trans. Am. Micr. Soc. **45**: 105. 1926.

Oedogonium macrospermum f. *patagonicum* Borge & Hirn; Borge, Bih. Sv. Vet.-Akad. Handl. **27**[10]: 9. 1901.

Dioecious, nannandrous, gynandrosporous; oogonium 1 (rarely 2), subdepressed to depressed-globose, operculate, division median, narrow; oospore subdepressed-globose, filling the oogonium; spore-wall smooth; dwarf male slightly curved or straight, not infrequently at right angles to the filament, on suffultory cell or on oogonium or scattered; antheridia exterior, 1–4; basal cell elongate; androsporangium 1–?; vegetative cell 10–16 by 30–80 μ; oogonium 39–46 by 34–44 μ; oospore 36–44 by 32–42 μ; dwarf male stipe 9–14 by 16–30 μ; androsporangium 14–15 by 10–11 μ; antheridium 7–10 by 6–16 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Ohio, Michigan, Iowa.
PLATE 24. *f. 391, 392.*

174. **Oedogonium costatum** Transeau; Tiff. Oedog. Mon. 146. 1930.

Dioecious, nannandrous, gynandrosporous; oogonium 1, depressed globose, with verticillate folds forming distinct pointed projections at the suture, operculate, division narrow, supramedian; oospore depressed-globose, filling oogonium; spore-wall smooth; androsporangium hypogynous; vegetative cell usually capitellate; terminal cell with rounded apex; vegetative cell 12–15 by 50–70 μ; oogonium 50–55 by 40–44 μ; oospore 48–53 by 36–42 μ; androsporangium 12–13 by 10–12 μ.

TYPE LOCALITY: Smithtown Pond, Long Island, New York.
DISTRIBUTION: New York, Florida.
PLATE 27. *f. 433.*

175. **Oedogonium rugulosum** Nordst. Oefv. Sv. Vet.-Akad. Förh. **34**[4]: 28. 1877.

Dioecious, nannandrous, gynandrosporous; oogonia 1 or 2, obovoid or obovoid-ellipsoid, operculate, division superior; oospore ellipsoid, nearly filling oogonium (or rarely globose-ellipsoid, not filling oogonium); spore-wall smooth; dwarf male on or near oogonium; andro-

sporangium usually 1, hypogynous; antheridium exterior, 1–?, curved; terminal cell apically obtuse; vegetative cell 4–8 by 10–35 μ; oogonium 16–20 by 22–29 μ; oospore 15–18 by 19–25 μ; androsporangium 6–8 by 10–11 μ; antheridium 4–5 by 5–6 μ; dwarf male 5–7 by 11–14 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New York, Michigan, Indiana, Illinois, Iowa, Florida, Mississippi.
PLATE 24. *f. 375.*

175*a*. **Oedogonium rugulosum** var. **rotundatum** (Hirn) Tiff. Brittonia **2**: 169. 1936. *Oedogonium rugulosum* f. *rotundatum* Hirn, Acta Soc. Sci. Fenn. **27**: 242. 1900. Oogonium single or 2-seriate; oospore globose-ellipsoid or ellipsoid; vegetative cell 5–8 by 15–31 μ; basal cell 7–8 by 22–27 μ; oogonium 19–23 by 20–28 μ; oospore 18–22 by 18–65 μ; dwarf male 5–8 by 11–15 μ; antheridium 4–6 by 4–6 μ; otherwise like the species. TYPE LOCALITY: Germany. DISTRIBUTION: Puerto Rico. PLATE 24. *f. 376, 377.*

175*b*. **Oedogonium rugulosum** var. **minutum** (Hansg.) Tiffany. *Oedogonium crispulum* var. *minutum* Hansg. Arch. Nat. Land. Böhmen **5**[6]: 44. 1886. *Oedogonium rugulosum* f. *minutum* Hirn, Acta Soc. Sci. Fenn. **27**: 242. 1900. *Oedogonium longatum* Skuja, Acta Horti Univ. Latv. **7**: 59. 1932. Not *O. longatum* Kütz. 1853. Smaller; median spore-wall distinctly crenulate; vegetative cell 3–7 by 12–40 μ; oogonium 13–18 by 18–24 μ; oospore 12–17 by 15–20 μ; dwarf male 4–6 by 13–16 μ; antheridium 5–6 by 6–9 μ. TYPE LOCALITY: Austria. DISTRIBUTION: Illinois, Oklahoma. PLATE 24. *f. 378.*

176. **Oedogonium Schmidlei** Gutw. Rozp. Akad. Umiej. II. **13**: 34. 1898.

Dioecious, nannandrous; oogonium 1, obovoid-globose, operculate, division superior (narrow?); oospore globose, not filling oogonium; spore-wall pitted, rather thick; dwarf male a little curved, on suffultory cell, antheridium exterior, 1?; vegetative cell 10 by 25–90 μ; suffultory cell 22 by 44 μ; oogonium 29 by 32–37 μ; oospore 26 by 26 μ; dwarf male stipe 5 by 27 μ; antheridium 5–6 by 5–6 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: British Columbia.
PLATE 24. *f. 390.*

177. **Oedogonium Croasdaleae** Jao, Rhodora **36**: 202. 1934.

Dioecious, nannandrous, gynandrosporous; oogonia 1–7, generally on the upper portion of the filament, quadrangular-ellipsoid, subovoid, or subellipsoid, operculate, division superior, sometimes wide; oospore of the same form as the oogonium and filling it, rarely not reaching the lower end; spore-membrane of three layers, the outer smooth, the median thick and lamellose, with 16–30 anastomosing, irregularly undulate, longitudinal ribs, the inner granulate; suffultory cell tumid; androsporangia to 8-seriate, epigynous, rarely hypogynous or subhypogynous; dwarf male goblet-shaped, curved, on the suffultory cell, occasionally on the oogonium, antheridium 1, interior; filaments tapering toward the base; terminal cell obtuse, often an oogonium or androsporangium; vegetative cell 20–30 by 95–230 μ; oogonium 56–77 by 88–116 μ; oospore 54–73 by 77–105 μ; suffultory cell 39–72 by 70–147 μ; androsporangium 10–55 by 7–77 μ; dwarf male 10–15 by 55–63 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 26. *f. 416–419.*

178. **Oedogonium monile** Berk. & Harv.; Harv. in Hook. f. Fl. Tasm. **2**: 342. 1859; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 40. 1874.

Dioecious, nannandrous; oogonia 1–8, subovoid or subglobose, operculate, division superior, very broad; oospore globose or subglobose, quite filling oogonium (except in length); spore-wall of three layers, the outer smooth, the middle scrobiculate, the inner smooth; vegetative cell sometimes capitellate; basal cell elongate; terminal cell obtuse; dwarf male a little curved, near oogonium; antheridium exterior, 1–?; vegetative cell 9–15 by 50–160 μ; suffultory cell 21–29 by 40–57 μ; oogonium 30–39 by 30–56 μ; oospore 28–38 by 28–38 μ; dwarf male stipe 9 by 25 μ; antheridium 7 by 7 μ.

TYPE LOCALITY: Victoria, Australia.
DISTRIBUTION: Massachusetts, Michigan, Indiana; Puerto Rico.
PLATE 25. *f. 393, 394.*

179. **Oedogonium Ackleyae** Tiffany, sp. nov.

Oedogonium macrandrium var. *scrobiculatum* Ackley, Trans. Am. Micr. Soc. 48: 305. 1929.

Dioecious, nannandrous, idioandrosporous (?); oogonia 1–3, globose to subglobose, with superior operculum; oospore globose, not quite filling oogonium, its middle wall scrobiculate; dwarf male on or near oogonium, or sometimes scattered, stipe 1-celled; antheridia 1–6; vegetative cell 9–11 by 27–60 μ; oogonium 32–35 by 30–35 μ; oospore 31–33 by 31–32 μ; dwarf male stipe 12 by 10–18 μ; antheridium 8–9 by 6–10 μ.

TYPE LOCALITY: Holland, Michigan.
DISTRIBUTION: Michigan.
PLATE 24. *f. 387.*

180. **Oedogonium longatum** Kütz. Tab. Phyc. 3: 11. 1853.

Dioecious, nannandrous; oogonia 1–3, ovoid to ellipsoid, operculate, division superior; oospore ellipsoid, about filling the oogonium; spore-wall usually smooth, basal cell elongate; terminal cell obtuse; dwarf male on the oogonium; antheridium exterior, 1–?, curved; vegetative cell 4–7 by 10–35 μ; oogonium 16–18 by 21–25 μ; oospore 15–17 by 17–20 μ; dwarf male stipe 5–6 by 10–15 μ; antheridium 4–5 by 5–6 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Massachusetts, Pennsylvania, Michigan, Iowa; British Columbia.
PLATE 24. *f. 379.*

181. **Oedogonium hians** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. 27: 227. 1900.

Dioecious, nannandrous, gynandrosporous; oogonia 1 or 2, subovoid or globose, operculate, division superior, wide; oospore globose, quite filling oogonium; spore-wall smooth, thick, and often lamellose; suffultory cell tumid; androsporangia 1 or 2, subepigynous; basal cell elongate; terminal cell apically obtuse; dwarf male curved, on suffultory cell, antheridium exterior, unicellular; vegetative cell 9–15 by 37–145 μ; suffultory cell 26–33 by 40–80 μ; oogonium 37–43 by 45–60 μ; oospore 33–40 by 33–40 μ; androsporangium 11–12 by 15–18 μ; dwarf male stipe 7–9 by 32–35 μ; antheridium 6–8 by 5–6 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Iowa.
PLATE 28. *f. 449, 450.*

182. **Oedogonium laetevirens** Wittr.; G. Zeller, Vidensk. Meddel. 1876: 427. 1877.

Dioecious, nannandrous; oogonia 1–3, subobovoid-globose, operculate, division superior; oospore globose or subdepressed-globose, filling oogonium or enlarging it; spore-wall smooth; dwarf male on oogonium, stipe a little curved, antheridium exterior, 1–?; vegetative cell 12–14 by 12–32 μ; oogonium 28–34 by 30–36 μ; oospore 23–32 by 23–29 μ; dwarf male stipe 7–10 by 17–21 μ; antheridium 6–8 by 5–7 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Puerto Rico.
PLATE 25. *f. 403.*

183. **Oedogonium macrandrium** Wittr. Oefv. Sv. Vet.-Akad. Förh. 27: 130. 1870.

Dioecious, nannandrous; oogonia 1–4, globose-ovoid, operculate, division superior; oospore globose, rarely ovoid-globose, not completely filling the oogonium; spore-wall smooth;

terminal cell obtuse or very shortly apiculate; dwarf male on or near the oogonium, stipe much curved, sometimes 2–3 celled; antheridia 1–7; vegetative cell 15–20 by 45–100 μ; oogonium 36–42 by 43–54 μ; oospore 31–37 by 33–39 μ; dwarf male stipe 12–13 by 24–33 μ; antheridium 9–10 by 7–10 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Pennsylvania, Ohio, Michigan, Iowa, North Carolina; Puerto Rico.
PLATE 25. *f. 396*.

183*a*. **Oedogonium macrandrium** var. **aemulans** Hirn, Acta Soc. Sci. Fenn. **27**: 235. 1900. ? *Oedogonium lundense* Wolle, Fresh-w. Algae U. S. 79. 1887. Not *O. lundense* Wittr. 1872. *Oedogonium macrandrium* f. *aemulans* Hirn, Acta Soc. Sci. Fenn. **34**[3]: 43. 1906. Vegetative cell 10–16 by 22–90 μ; oogonia in groups of 2–9, 28–42 by 33–45 μ; oospore 26–36 by 26–36 μ; dwarf male stipe 9–12 by 20–25 μ; antheridium 6–9 by 7–10 μ. TYPE LOCALITY: Brazil. DISTRIBUTION: Pennsylvania, Michigan, Illinois, Mississippi, Oklahoma California. PLATE 25. *f. 397*.

183*b*. **Oedogonium macrandrium** f. **lundense** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **34**[3]: 42. 1906. *Oedogonium lundense* Wittr. Bot. Notiser **1872**: 4. 1872. Oogonium subobovoid-globose; oospore-wall sometimes thick; vegetative cell 13–21 by 13–50 μ; oogonium 31–40(45) by 34–43 μ; oospore 29–36(40) by 29–36(40) μ; dwarf male stipe 10–15 by (21)24–32 μ; antheridium 8–10 by 6–9 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Florida. PLATE 25. *f. 402*.

183*c*. **Oedogonium macrandrium** var. **propinquum** (Wittr.) Hirn, Acta Soc. Sci. Fenn. **34**[3]: 42. 1906. *Oedogonium propinquum* Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 129. 1870. *Oedogonium eremitum* Hallas, Bot. Tidssk. **26**: 403. 1905. Smaller; oogonia 1–3; vegetative cell 8–14 by 18–70 μ; oogonium 28–36 by 28–45 μ; oospore 24–31 by 24–31 μ; dwarf male stipe 11–14 by 20–35 μ; antheridium 7–9 (12) by 6–8 μ. TYPE LOCALITY: Sweden. DISTRIBUTION: Massachusetts, Ohio, Michigan, Indiana, Illinois, North Carolina, Alabama, Oklahoma; Puerto Rico. PLATE 25. *f. 401*.

183*d*. **Oedogonium macrandrium** var. **Hohenackerii** (Wittr.) Tiff. Ohio Jour. Sci. **29**: 75. 1929. *Oedogonium Hohenackerii* Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 23. 1874. Vegetative cell 12–15 by 24–45 μ; oogonium single, 29–33 by 30–35 μ; oospore 27–31 by 28–31 μ; androsporangium 11–13 by 10–14 μ; dwarf male stipe 9–14 by 18–24 μ; antheridium 5–6 by 5–8 μ. TYPE LOCALITY: India. DISTRIBUTION: Ohio, Michigan, North Carolina, Oklahoma. PLATE 25. *f. 398–400*.

184. **Oedogonium ciliatum** (Hassall) Pringsh. Ber. Akad. Berlin **1856**: 227. 1856.

Vesiculifera ciliata Hassall, Hist. Brit. Fresh-w. Algae **1**: 202. 1845.
Oedogonium piliferum Auersw.; Rab. Alg. Sachs. *474*. 1855.

Dioecious, nannandrous, gynandrosporous; oogonia 1–7, ovoid, to ovid-ellipsoid (rarely nearly ellipsoid), operculate, division superior or nearly supreme; oospore ovoid to subellipsoid, rarely globose, nearly filling oogonium; spore-wall smooth; androsporangia to 8-seriate, often subepigynous; basal cell elongate; terminal cell setiform; dwarf male curved, on oogonium; antheridium exterior, 1; vegetative cell 14–24 by 35–92 μ; oogonium 43–50 by 55–72 μ; oospore 40–47 by 44–57 μ; androsporangium 14–20 by 10–20 μ; dwarf male stipe 10–15 by 24–31 μ; antheridium 8–10 by 10–11 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, Ohio, Michigan, Indiana, Iowa; British Columbia.
PLATE 25. *f. 395*.

185. **Oedogonium pluviale** Nordst.; Rab. Alg. Eur. *2257*. 1871.

? *Vesiculifera dissiliens* Hassall, Hist. Brit. Fresh-w. Algae **1**: 202. 1845.
Oedogonium intermedium Rab. Alg. Sachs. *828*. 1859. Not *O. intermedium* Kütz. 1843.
Oedogonium diplandrium Jurányi, Jahrb. Wiss. Bot. **9**: 27. 1873.
Oedogonium Montagnei var. *saxicola* Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**[6]: 50. 1876.
Oedogonium fonticola Wolle, Fresh-w. Algae U. S. 93. 1887. Not *O. fonticola* A. Br. 1849.
Oedogonium Montagnei var. *submarinum* Wittr.; Wittr. & Nordst. Algae Exsicc. *905*. 1889; Bot. Notiser **1889**: 161. 1889.
? *Oedogonium fonticola* var. *flavescens* Hansg. Sitz.-ber. Böhm. Ges. Wiss. **1891**: 305. 1891.

Dioecious, nannandrous, idioandrosporous; oogonium 1 (very rarely 2–3), obovoid-globose or subglobose, operculate, division superior; oospore subglobose or subellipsoid-globose, almost filling oogonium; spore-wall smooth; vegetative cell varying much in the same plant; basal cell elongate; terminal cell obtuse; androsporangia to 10-seriate; dwarf male broadly obovoid, unicellular, on oogonium; vegetative cell 22–29 by 20–55 μ; androsporangial vegetative cell 18–27 by 18–27 μ; oogonium 34–45 by 34–50 μ; oospore 32–40 by 31–43 μ; androsporangium 17–25 by 6–13 μ; dwarf male 10 by 14–15 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: California.
PLATE 23. *f. 361, 362*.

186. **Oedogonium spectabile** Hirn, Acta Soc. Sci. Fenn. **27**: 284. 1900.

Dioecious, nannandrous, idioandrosporous; oogonium 1, obovoid-ellipsoid or obovoid, operculate, division superior; oospore ellipsoid, nearly filling oogonium; spore-wall smooth; androsporangia to 16-seriate, the androsporangial part of the filament often curved; basal cell elongate; dwarf male broadly obovoid, unicellular, on oogonium; vegetative cell 20–32 by 25–90 μ; oogonium 42–50 by 63–72 μ; oospore 40–48 by 55–62 μ; androsporangium 19–27 by 11–19 μ; dwarf male 11–14 by 16–21 μ.

TYPE LOCALITY: Australia.
DISTRIBUTION: Mississippi.
PLATE *27. f. 421–423.*

187. **Oedogonium obtruncatum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 41. 1874.

Dioecious, nannandrous, gynandrosporous; oogonia 1–6, ellipsoid, or globose-ellipsoid, operculate, division supreme, operculum small and deciduous; oospore of same form as oogonium, nearly filling it; spore-wall smooth; vegetative cell evidently capitellate; basal cell elongate; terminal cell (often the oogonium) apically obtuse; dwarf male oblong-pyriform, curved, unicellular, on oogonium; vegetative cell 18–22 by 56–110 μ; oogonium 45–55 by 56–68 μ; oospore 43–53 by 52–66 μ; androsporangium 20 by 24 μ; dwarf male stipe 17–20 by 36–40 μ; antheridium 6–8 by 4–6 μ.

TYPE LOCALITY: India.
DISTRIBUTION: Ohio, Illinois, Wyoming; Puerto Rico.
PLATE 25. *f. 408.*

187*a*. **Oedogonium obtruncatum** var. **ellipsoideum** Wittr. Bot. Notiser **1878**: 141. 1878. Oogonia 1 or 2, longer, ellipsoid, terminal; vegetative cell 17–23 by 54–110 μ; oogonium 42–54 by 66–75 μ; oospore 40–52 by 60–72 μ. TYPE LOCALITY: Venezuela. DISTRIBUTION: Florida; Puerto Rico. PLATE 25. *f. 409.*

188. **Oedogonium acrosporum** De Bary, Abh. Senck. Nat. Ges. **1**: 47. 1854.

Oedogonium acrosporum f. *connectens* Wittr.; Wittr. & Nordst. Algae Exsicc. *401,* in part; Bot. Notiser **1882**: 54. 1882; C. H. S. Phyc. Bor. Am. *409.* 1898; Hirn, Acta Soc. Sci. Fenn. **27**: 245. 1900.

Dioecious, nannandrous, gynandrosporous (or idioandrosporous); oogonium 1, terminal, ellipsoid, operculate, division supreme, operculum small and deciduous; wall of oogonium with longitudinal, sometimes anastomosing, ridges on the inner surface; oospore quite filling the oogonium; outer layer of spore-wall with 23–30 longitudinal ridges, closely fitting in between the ridges of the oogonium, the inner smooth; basal cell elongate; terminal cell obtuse; androsporangia 1–8, hypogynous or scattered; dwarf male curved, on the suffultory cell, stipe sometimes 2–3 celled, upper cells long; antheridia exterior, 1 or 2; vegetative cell 12–21 by 40–125 μ; suffultory cell 16–25 by 26–76 μ; oogonium 35–48 by 50–63 μ; androsporangium 16–21 by 12–15 μ; upper cell of dwarf male stipe, 6–8 by 55–71 μ, the lower cell 9–12 by 30–38 μ; antheridium 6–8 by 9–15 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Massachusetts, New York, Ohio, Michigan, Illinois, Iowa, Florida, Wyoming; Puerto Rico; British Columbia.
PLATE 26. *f. 410.*

188*a*. **Oedogonium acrosporum** var. **boreale** Wolle, Fresh-w. Algae U. S. 84. 1887. *Oedogonium acrosporum* f. *boreale* Hirn, Acta Soc. Sci. Fenn. **27**: 245. 1900; Tiff. Oedog. Monog. 158. 1930. Filaments usually not more than 10-celled; vegetative cell 12–17 by 45–140 μ; suffultory cell 20–40 by 52–83 μ; oogonium 36–45 by 57–67 μ; oospore 32–40 by 45–62 μ; dwarf male 12–16 by 34–40 μ. TYPE LOCALITY: Pennsylvania and New Jersey. DISTRIBUTION: New Jersey, Pennsylvania, Ohio. PLATE 26. *f. 414.*

188*b*. **Oedogonium acrosporum** var. **bathmidosporum** (Nordst.) Hirn, Acta Soc. Sci. Fenn. **27**: 246. 1900. *Oedogonium bathmidosporum* Nordst. Bot. Notiser **1878**: 179. 1878. *Oedogonium acrosporum* C. H. S. Phyc. Bot. Am. *163.* 1896. Not *O. acrosporum* De Bary. 1854. Smaller; ribs

fewer, 11–17, evidently crenulate; dwarf male stipe unicellular; vegetative cell 12–17 by 35–125 μ; suffultory cell 15–22 by 40–110 μ; oogonium 30–40 by 40–59 μ; dwarf male stipe 9–11 by 30–34 μ; antheridium 8–10 by 9–13 μ. TYPE LOCALITY: Brazil. DISTRIBUTION: Massachusetts, New York, Michigan. PLATE 26. *f. 411.*

188*c*. **Oedogonium acrosporum** var. **floridense** Wolle. Fresh-w. Algae U. S. 83. 1887. Plant usually less than 10-celled; smaller with elongate vegetative cell and more tumid suffultory cell; dwarf male stipe 2–3-celled; vegetative cell 7–8 by 36–85 μ; oogonium 33–35 by 45–50 μ. TYPE LOCALITY: Florida. DISTRIBUTION: Florida. PLATE 26. *f. 413.*

188*d*. **Oedogonium acrosporum** var. **majusculum** Nordst. Minneskr. Fys. Sällsk. Lund **7**: 21. 1878. Smaller; vegetative cell 14–21 by 50–165 μ; suffultory cell 18–28 by 42–65 μ; oogonium 44–56 by 54–70 μ; oospore 40–52 by 50–65 μ. TYPE LOCALITY: Hawaii. DISTRIBUTION: Michigan. PLATE 26. *f. 412.*

189. **Oedogonium tentoriale** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 248. 1900.

Dioecious, nannandrous; oogonium 1, terminal, broadly ellipsoid or obovoid-globose, division supreme, lid small, deciduous, oogonium-wall longitudinally ribbed on the inner surface, ribs often anastomosate; oospore quite filling oogonium; outer layer of the spore-wall with 40–45 longitudinal, very finely crenulate ribs, closely filling in between the ribs of the oogonium, connected by delicate transverse lines, inner layer smooth; basal cell elongate; terminal cell obtuse; dwarf male suberect, on suffultory cell, antheridium exterior, 1–?; vegetative cell 20–33(37) by 60–225 μ; oogonium 66–82 by 73–88 μ; oospore 64–80 by 70–83 μ; dwarf male stipe 10–15 by 37–48 μ; antheridium 9–12 by 7 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Illinois, Florida.
PLATE 26. *f. 415.*

190. **Oedogonium Reinschii** Roy; Cooke, Brit. Fresh-w. Algae 160. 1883; Tiff. Rev. Alg. **8**: 419. 1936.

Cymatonema sp. Reinsch, Contr. Alg. Fung. **1**: xi. 1875.
Oedogonium sterile Hansg. Arch. Nat. Land. Böhmen **6**[6]: 260. 1888.

Monoecious; oogonia 1 or 2, globose or depressed-globose or ovoid, rarely terminal, with wide median operculum; oospore similar in shape to oogonium, filling it or not, its wall smooth; antheridium single, subepigynous or subhypogynous; sperms 2, division vertical; vegetative cell often subhexagonal or subellipsoid, sometimes cylindric or subcylindric; basal cell subhemispheric; terminal cell apically obtuse; vegetative cell 5–11 by 9–24 μ; oogonium 17–20 by 15–21 μ; oospore 13–18 by 14–17 μ; antheridium 4–5 by 4–5 μ; basal cell 8–16 by 5–10 μ.

TYPE LOCALITY: Scotland.
DISTRIBUTION: Massachusetts, New York, Michigan, Iowa, Virginia, North Carolina, Florida; British Columbia.
PLATE 19. *f. 275.*

191. **Oedogonium undulatum** (Bréb.) A. Br.; De Bary, Abh. Senck. Nat. Ges. **1**: 94. 1854; Hirn, Acta Soc. Sci. Fenn. **27**: 257. 1900.

Cymatonema confervaceum Kütz. Sp. Alg. 375. 1849.
Conferva undulata Bréb.; Kütz. Sp. Alg. 375, as synonym. 1849.
Oedogonium undulatum var. *Moebiusii* Schmidle, Flora **82**: 297. 1896.
Oedogonium undulatum var. *interrupte-incisum* Schröder, Forsch. Biol. Sta. Plön **5**: 38. 1897.

Dioecious, nannandrous, gynandrosporous or idioandrosporous; oogonia 1 or 2, subglobose or ellipsoid-globose, operculate, division inferior, wide; oospore globose or subglobose, quite filling oogonium, spore-wall smooth, sometimes thick; androsporangia to 7-seriate; vegetative cell undulate (4 undulate constrictions); basal cell elongate, not undulate; terminal cell (sometimes oogonium) apically obtuse; dwarf male elongate-obconic, usually on suffultory cell, rarely on other vegetative cell near oogonium, antheridium interior; vegetative cell 15–22 by 45–110 μ; oogonium 48–56 by 50–75 μ; oospore 42–50 by 42–52(60) μ; androsporangium 15–21 by 7–14 μ; dwarf male 8–10 by 48–65(70) μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Michigan, Indiana, Iowa, Florida, Wyoming.
PLATE 24. *f. 373.*

191*a*. **Oedogonium undulatum** f. **senegalense** (Nordst.) Hirn, Acta Soc. Sci. Fenn. **27**: 261. 1900. *Oedogonium undulatum* var. *senegalense* Nordst. Acta Univ. Lund **16**[4]: 13. 1880. Oogonium and oospore smaller than the type; dwarf male shorter; oogonia to 5-seriate; vegetative cell with 3 median swellings, repand, the terminal swelling entire, 15–22 by 45–110 μ; oogonium 42–52 by 44–63 μ; oospore 37–44 by 36–44 μ; androsporangium 15–19 by 9–18 μ; dwarf male 6–8 by 36–46 μ. TYPE LOCALITY: Africa. DISTRIBUTION: Massachusetts. PLATE 24. *f. 374.*

192. **Oedogonium sinuatum** Transeau; Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium undulatum var. *americanum* Transeau, Ohio Jour. Sci. **17**: 232. 1917.

Dioecious, nannandrous, idioandrosporous; oogonia 1 or 2, subglobose or ellipsoid-globose, with inferior operculum, division wide; oospore globose or nearly so, not filling oogonium; wall smooth; vegetative cell undulate (4 undulate constrictions); dwarf male elongate-obconic, usually on suffultory cell, antheridium interior; vegetative cell (13)19–26 by 48–110 μ; oogonium 56–68 by 45–80 μ; oospore 42–60 by 42–56 μ; holdfast cell 17–18 by 50–60 μ.

TYPE LOCALITY: Trout Lake, Michigan.
DISTRIBUTION: Michigan, Indiana.
PLATE 24. *f. 372.*

193. **Oedogonium nodulosum** Wittr. Bih. Sv. Vet.-Akad. Handl. **1**[1]: 22. 1872.

Monoecious; oogonia 1 or 2, obovoid-globose or more rarely obovoid-ellipsoid, operculate, division superior; oospore globose or subglobose or more rarely globose-ellipsoid, nearly filling oogonium; spore-wall smooth, often thick; antheridia 1–3, subepigynous or hypogynous; sperms 2, division horizontal; basal cell elongate, not constricted; terminal cell obtuse or apiculate; vegetative cell with two undulate constrictions, 20–29 by 30–140 μ; oogonium 48–57 by 56–73 μ; oospore 46–53 by 49–56 μ; antheridium 18–25 by 7–9 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan.
PLATE 23. *f. 370, 371.*

194. **Oedogonium commune** (Hirn) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium nodulosum C. H. S. Phyc. Bor. Am. *74*. 1895. Not *O. nodulosum* Wittr. 1872.
Oedogonium nodulosum var. *commune* Hirn, Acta Soc. Sci. Fenn. **27**: 187. 1900.

Monoecious; oogonia 1 or 2, subobovoid-ellipsoid to ellipsoid (rarely globose-ellipsoid), with superior operculum; oospore globose to globose-ellipsoid, practically filling oogonium, its wall smooth and sometimes thick; antheridia 1 or 2, hypogynous or subepigynous, sperms 2, division horizontal; vegetative cell with two undulate constrictions, 22–29 by 35–140 μ; oogonium 64–74 by 70–90 μ; oospore 56–70 by 67–80 μ; antheridium 18–26 by 7–10 μ.

TYPE LOCALITY: Finland.
DISTRIBUTION: Massachusetts, Wisconsin.
PLATE 23. *f. 369.*

195. **Oedogonium elegans** var. **americanum** Jao, Rhodora **36**: 204. 1934.

Dioecious, nannandrous, gynandrosporous or (?) idioandrosporous; oogonium solitary, depressed-globose, operculate, division median; oospore depressed-globose, filling the oogonium or not; spore-wall smooth; androsporangia 1 or 2, subhypogynous or scattered, generally a little tumid; wall of vegetative cell, oogonium, and androsporangium densely and minutely granulate; vegetative cell broadly capitellate; terminal cell apically obtuse; basal cell sub-

hemispheric to depressed-globose, wall vertically plicate; vegetative cell 4–8 by 25–68 μ; oogonium 27–32 by 24–27 μ; oospore 20–29 by 19–20 μ; androsporangium 8–10 by 9–13 μ; basal cell 14–17 by 11–13 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 22. *f. 356–358.*

196. **Oedogonium minus** (Wittr.) Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 9. 1874.

Oedogonium punctatostriatum var. *minus* Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 123. 1870.
Oedogonium spirogranulatum Schmidle, Flora **78**: 43. 1894.

Monoecious; oogonium 1, pyriform-globose or depressed-globose, operculate, division median, wide; oospore depressed-globose, not filling oogonium; spore-wall smooth; antheridia to 10-seriate, subepigynous or subhypogynous or rarely scattered, cell a little tumid; sperm 1; vegetative cell somewhat capitellate; wall of vegetative cell and of oogonium spirally punctate; basal cell depressed-globose or subhemispheric, wall vertically plicate; vegetative cell 9–13 by 30–78 μ; oogonium 34–46 by 28–42 μ; oospore 30–42 by 26–36 μ; antheridium 9–13 by 3–5 μ.

TYPE LOCALITY: Europe.
DISTRIBUTION: Michigan, Massachusetts, Florida.
PLATE 23. *f. 368.*

197. **Oedogonium spirostriatum** Tiff. Trans. Am. Micr. Soc. **55**: 2. 1936.

Monoecious; oogonium single, depressed-globose, with supramedian operculum, wide; oospore depressed-globose, not filling oogonium; wall smooth; antheridium single, alternating with vegetative cell, near oogonium or scattered; sperm single (?); wall of vegetative cell, of oogonium, and of antheridium spirally punctate; basal cell depressed-globose to half-round or nearly spheric, vertically plicate; vegetative cell capitellate, 16–24 by 50–160 μ; oogonium 49–56 by 40–50 μ; oospore 40–47 by 34–40 μ; antheridium 20–23 by 17–20 μ; basal cell 27–34 by 22–24 μ.

TYPE LOCALITY: Arcadia, Florida.
DISTRIBUTION: Florida.
PLATE 23. *f. 366, 367.*

198. **Oedogonium latiusculum** Tiff. Ohio Jour. Sci. **24**: 182. 1924.

Dioecious, macrandrous; oogonia 1 or 2, globose to ellipsoid-globose, operculate, division median, very wide; oospore of the same form as, and very nearly or completely filling the oogonium; wall smooth; male plant somewhat larger than the female; antheridium 1, usually alternating with a single vegetative cell, sperm 1; vegetative cell distinctly capitellate; basal cell of filament subhemispheric, not elongate; filament not infrequently incrusted with lime; female vegetative cell 10–18 by 16–40 μ, male 14–20 by 16–40 μ; oogonium 32–36 by 32–40 μ; oospore 28–32 by 28–34 μ; antheridium 14–18 by 12–20 μ; basal cell 16–24 by 12–16 μ.

TYPE LOCALITY: Spirit Lake, Iowa.
DISTRIBUTION: Indiana, Iowa, Kentucky, Florida, Alabama, Mississippi; Puerto Rico.
PLATE 20. *f. 292, 293.*

199. **Oedogonium patulum** Tiff. Ohio Jour. Sci. **34**: 324. 1934.

Oedogonium Hirnii var. *africanum* G. West, Jour. Linn. Soc. **38**: 98. 1907.

Monoecious; oogonium single, globose to subglobose, with superior pore; oospore similar to oogonium in shape and usually filling it, its wall smooth; antheridia 1–3, subepigynous, sperms 2, division horizontal; vegetative cell broadly capitellate, 13–15 by 33–60 μ; oogonium 39–40 by 38–40 μ, oospore 33–36 by 33–36 μ; antheridium 13–14 by 5–6 μ.

TYPE LOCALITY: Africa.
DISTRIBUTION: Iowa.
PLATE 9. *f. 110.*

200. **Oedogonium capitellatum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 7. 1874.

Oedogonium piliferum Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 122. 1870. Not *O. piliferum* Auersw. 1855.

Monoecious; oogonium 1, subdepressed or depressed-globose, operculate, division median, narrow but distinct; oospore depressed-globose, completing (or nearly so) oogonium; spore-wall smooth; antheridia 1 or 2, subepigynous or hypogynous or rarely scattered; sperm 1 (?); vegetative cell capitellate; basal cell subhemispheric; terminal cell piliform; vegetative cell 6–9 by 20–60 μ; oogonium 20–26 by 17–23 μ; oospore 18–23 by 15–19 μ; antheridium 6–7 by 8–9 μ; basal cell 16–18 by 6–8 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Ohio, Illinois, Florida, Alabama, Mississippi, Oklahoma; British Columbia.
PLATE 20. *f. 306, 307*.

201. **Oedogonium spurium** Hirn, Acta Soc. Sci. Fenn. **27**: 301. 1900; Tiff. Trans. Am. Micr. Soc. **55**: 5. 1936.

Monoecious, rarely dioecious; oogonium subglobose to depressed-globose to globose, operculate, division supramedian; oospore depressed-globose, filling oogonium or not; spore-wall smooth; antheridia to 6-seriate, subepigynous or scattered, sperm single; vegetative cell capitellate; basal cell elongate; terminal cell apically obtuse or truncate-obtuse; vegetative cell 7–13 by 20–55 μ; oogonium 26–30 by 23–33 μ; oospore 23–28 by 21–26 μ; antheridium 7–8 by 8–11 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Ohio.
PLATE 19. *f. 272–274*.

202. **Oedogonium ouchitanum** Taft, Bull. Torrey Club **62**: 288. 1935.

Monoecious; oogonia 1 or 2, pyriform to subpyriform, opening by a superior operculum; oospore globose (rarely subglobose), not filling the oogonium longitudinally, its wall smooth; antheridia ?–3, scattered; vegetative cell capitellate; basal cell elongate; terminal cell obtuse; vegetative cell 5–13 by 33–50 μ; oogonium 30–33 by 33–40 μ; oospore 26–30 by 23–30 μ; antheridium 8–9 by 10–13 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 20. *f. 303, 304*.

203. **Oedogonium bohemicum** Hirn, Acta Soc. Sci. Fenn. **27**: 169. 1900.

Monoecious; oogonium 1, globose, operculate, division superior; oospore globose, filling oogonium; spore-wall smooth; antheridia 1–4, subepigynous; sperms 2, division horizontal; vegetative cell capitellate, 10–16 by 21–66 μ; oogonium 42–45 by 46–49 μ; oospore 40-43 by 40–43 μ; antheridium 9–10 by 5–7 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: Illinois, Iowa, Oklahoma.
PLATE 20. *f. 305*.

204. **Oedogonium Taylorii** Jao, Rhodora **36**: 211. 1934.

Dioecious, nannandrous, idioandrosporous; oogonia 1–3, globose or ellipsoid-globose, with superior pore; oospore globose, very rarely subellipsoid-globose, partly or completely filling the oogonium; spore-wall of three layers, the outer and inner smooth, the middle with 22–28 crenulate to slightly dentate, longitudinally continuous ribs, connected to the disc-shaped and

reticulate polar regions, polar axis nearly parallel to the filament; suffultory cell enlarged; androsporangia 1–4, mostly terminal on the filament; dwarf male a little curved, on the suffultory cell; antheridium 1, exterior; sperm single; vegetative cell capitellate; terminal cell obtuse; basal cell elongate; vegetative cell 8–19 by 38–112 μ; suffultory cell 32–34 by 54–74 μ; oogonium 35–51 by 46–74 μ; oospore 32–46 by 32–51 μ; androsporangium 16–18 by 16–23 μ; dwarf male stipe 9–13 by 48–51 μ; antheridium 6–16 by 4–7 μ; basal cell 12–19 by 48–90 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 34, *f. 529–531*; 36. *f. 559*.

205. **Oedogonium Areschougii** Wittr. Oefv. Sv. Vet.-Akad. Förh. **27**: 122. 1870.

Dioecious, nannandrous, gynandrosporous; oogonia 1–6, subdepressed- or depressed-pyriform-globose, operculate, division median, wide; oospore globose, rarely subdepressed-globose, not completely filling the oogonium longitudinally; spore-wall smooth; androsporangia 1–6, subepigynous or hypogynous or rarely scattered; vegetative cell capitellate; basal cell elongate; terminal cell, usually the oogonium, apically obtuse; dwarf male obovoid, unicellular, on oogonium; vegetative cell 8–13 by 35–75 μ; oogonium 34–39 by 36–40 μ; oospore 22–26 by 22–25 μ; androsporangium 9–11 by 10–12 μ; antheridium 6–7 by 13–15 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: New Jersey, Florida; Greenland.
PLATE 27. *f. 424*.

205*a*. **Oedogonium Areschougii** var. **contortifilum** Jao, Rhodora **36**: 199. 1934. Oogonia 1–7, depressed-globose; filaments often curved or spiral; vegetative cell 7–12 by 30–65 μ; oogonium 30–33 by 26–30 μ; oospore 26–30 by 24–26 μ; androsporangium 7–8 by 6–12 μ; dwarf male 5–7 by 9–12 μ; basal cell 9–16 by 26–32 (rarely 64) μ. TYPE LOCALITY: Woods Hole, Massachusetts. DISTRIBUTION: Massachusetts. PLATE 27. *f. 425–427*.

206. **Oedogonium subplenum** Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium Areschougii var. *americanum* Tiff. Bot. Gaz. **83**: 205. 1927.

Dioecious, nannandrous, idioandrosporous and gynandrosporous; oogonia 1–3, depressed-globose to depressed-pyriform-globose, division median and wide; oospore globose, not filling oogonium, its wall smooth; androsporangia to 11-seriate; dwarf male obovoid, 1-celled, on oogonium; vegetative cell capitellate, 7–12 by 23–80 μ; oogonium 29–38 by 26–41 μ; oospore 21–28 by 19–26 μ; androsporangium 7–10 by 7–11 μ; dwarf male 6–7 by 6–10 μ.

TYPE LOCALITY: De Soto, Illinois.
DISTRIBUTION: Massachusetts, Illinois, Florida.
PLATE 27. *f. 428, 429*.

207. **Oedogonium pseudoplenum** Tiff. Ohio Jour. Sci. **34**: 326. 1934.

? *Oedogonium obtruncatum* var. *oblatum* Tilden, Am. Algae *3*. 1894.
Oedogonium Areschougii f. *robustum* Hirn, Acta Soc. Sci. Fenn. **27**: 271. 1900.
Oedogonium Areschougii f. *majus* Collins, Tufts Coll. Stud. **3**: 88. 1912.

Dioecious, nannandrous, idioandrosporous; oogonia up to 8-seriate, subdepressed- to pyriform-globose, operculate, division median; oospore globose to depressed-globose, not filling oogonium, its wall smooth; androsporangia to 4-seriate; dwarf male obovoid, unicellular, on oogonium; vegetative cell capitellate, 12–17 by 36–120 μ; oogonium 36–40 by 36–53 μ; oospore 30–32 by 27–31 μ; androsporangium 9–12 by 10–13 μ; dwarf male 6–8 by 14–15 μ.

TYPE LOCALITY: England.
DISTRIBUTION: Minnesota.
PLATE 27. *f. 430, 431*.

208. **Oedogonium confertum** Hirn, Acta Soc. Sci. Fenn. **27**: 272. 1900.

Dioecious, nannandrous, idioandrosporous (?); oogonia 1–4, depressed-globose or depressed-pyriform, operculate, division median, wide; oospore globose or subdepressed-globose, not

filling oogonium longitudinally; spore-wall smooth; vegetative cell capitellate; dwarf male obovoid, on oogonium; vegetative cell 19–26 by 66–105 μ; oogonium 56–63 by 44–56 μ; oospore 42–48 by 40–44 μ; dwarf male 10–12 by 13–16 μ.

TYPE LOCALITY: Australia.
DISTRIBUTION: Ohio, Florida.
PLATE 28. *f. 448.*

209. **Oedogonium brasiliense** Borge, Bih. Sv. Vet.-Akad. Handl. **24**[12]: 4. 1899.

Dioecious, nannandrous, idioandrosporous; oogonia 1–3, subdepressed-globose or subpyriform-globose, operculate, division median, broad; oospore subdepressed-globose, not quite filling oogonium; spore-wall smooth; androsporangia to 5-seriate; vegetative cell capitellate; dwarf male obovoid, unicellular, on oogonium; vegetative cell 16–22 by 35–95 μ; oogonium 53–63 by 52–59 μ; oospore 48–53 by 45–50 μ; androsporangium 15–16 by 11–14 μ; dwarf male 10–12 by 14–19 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Florida.
PLATE 28. *f. 453.*

210. **Oedogonium clavatum** Hallas, Bot. Tidssk. **26**: 399. 1905.

Dioecious, nannandrous, gynandrosporous; oogonia 1–3, subpyriform to subdepressed-globose, operculate, division supramedian; oospore subdepressed, depressed-globose, or globose, quite filling oogonium (rarely not); spore-wall smooth; androsporangia 1 or 2, scattered; dwarf male obovoid, unicellular, on oogonium; vegetative cell capitellate or nearly clavate; basal cell subhemispheric; vegetative cell 2–9 by 5–80 μ; oogonium 14–26 by 16–21 μ; oospore 12–21 by 12–14 μ; androsporangium 4–6 by 5–7 μ; dwarf male 6 by 14–15 μ.

TYPE LOCALITY: Denmark.
DISTRIBUTION: New York.
PLATE 25. *f. 407.*

211. **Oedogonium oelandicum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 17. 1874.

Dioecious, nannandrous, gynandrosporous; oogonia 1–7, depressed-globose, with 12–16 longitudinal ridges, operculate, division supramedian, rather broad; oospore depressed-globose, nearly filling oogonium; spore-wall smooth; androsporangia to 6-seriate; vegetative cell capitellate; terminal cell apically obtuse; dwarf male obovoid, unicellular, on oogonium; vegetative cell 10–15 by 25–125 μ; oogonium 31–40 by 25–32 μ; oospore 25–36 by 23–30 μ; androsporangium 7–12 by 10–18 μ; dwarf male 7–8 by 12–15 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan, Florida; British Columbia.
PLATE 27. *f. 434.*

211*a*. **Oedogonium oelandicum** var. **novae-angliae** Jao, Rhodora **36**: 207. 1934. Oogonia 1–4 with as many as 16 longitudinal ridges; androsporangia 1–7; vegetative cell 9–16 by 32–86 μ; suffultory cell 13–20 by 30–64 μ; oogonium 40–51 by 33–43 μ; oospore 35–43 by 30–36 μ; androsporangium 11–14 by 9–17 μ; dwarf male 8–10 by 9–13 μ. TYPE LOCALITY: Woods Hole, Massachusetts. DISTRIBUTION: Massachusetts. PLATE 27. *f. 435–437.*

212. **Oedogonium megaporum** Wittr. Bot. Notiser **1872**: 3. 1872.

Oedogonium oelandicum var. *subpyriforme* Wittr.; Wittr. & Nordst. Algae Exsicc. *1218*. 1896; Bot. Notiser **1897**: 84. 1897.

Dioecious, nannandrous, idioandrosporous; oogonia 1–6, broadly pyriform, with 12–16 rounded longitudinal ridges, operculate, division supramedian and wide; oospore subdepressed-globose, not filling oogonium; spore-wall smooth; androsporangia to 4-seriate; vegetative cell capitellate; basal cell elongate; terminal cell apically obtuse; dwarf male unicellular, broadly

obovoid, on oogonium; vegetative cell 13–17 by 40–100 μ; oogonium 37–42 by 40–45 μ; oospore 31–35(38) by 27–30 μ; androsporangium 10–11 by 12–22 μ; dwarf male 8–12 by 13–16 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Michigan.
PLATE 28. *f. 441, 442.*

213. **Oedogonium Jaoii** Tiffany, sp. nov.

Oedogonium boreale var. *americanum* Jao, Rhodora **36**: 199. 1934.

Dioecious, nannandrous, idioandrosporous; oogonia 1–4, scattered or more often terminal, depressed-globose to broadly pyriform, wall up to 5 μ thick and lamellose, with 16–22 longitudinally median folds, operculate, division supramedian and wide, margin slightly undulate; oospore subdepressed-globose, nearly or not filling the oogonium; spore-wall smooth; suffultory cell sometimes tumid, reaching a diameter of 27 μ; androsporangia 1–6, often terminal; dwarf male unicellular, broadly obovoid, situated on the oogonium; vegetative cells capitellate, the lower generally more slender than the upper; terminal cell apically obtuse, often an oogonium or androsporangium; basal cell oblong-elongate; vegetative cell 12–19 by 32–82 μ; oogonium 41–54 by 38–54 μ; oospore 33–42 by 32–40 μ; androsporangium 12–16 by 12–19 μ; dwarf male 8–13 by 9–13 μ; basal cell 19–22 by 32–58 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 28. *f. 443–445.*

214. **Oedogonium circinatum** Tiff. Trans. Am. Micr. Soc. **55**: 1. 1936.

Dioecious, nannandrous, idioandrosporous (?); oogonia single or in groups of 2, usually terminal, depressed-globose, with 4–9 rounded projections arranged in a median whorl, operculate, division inframedian; oospore depressed-globose to nearly globose, not quite filling oogonium, its wall smooth; suffultory cell sometimes enlarged (up to 8 μ); upper part of filament nearly always circinate or irregularly contorted; vegetative cell capitellate; terminal cell, usually on oogonium, apically conic; basal cell subhemispheric; dwarf male unicellular, obovoid, small, situated on suffultory cell; vegetative cell 3–6 by 8–32 μ; oogonium 16–20 by 12–16 μ; oospore 14–18 by 10–13 μ; dwarf male 3–4 by 6–7 μ; basal cell 15–16 by 5–6 μ.

TYPE LOCALITY: Arcadia, Florida.
DISTRIBUTION: Florida.
PLATE 27. *f. 438, 439.*

215. **Oedogonium platygynum** Wittr. Bot. Notiser **1872**: 1. 1872.

Oedogonium platygynum f. *majus* W. West, Jour. Linn. Soc. **29**: 109. 1892.
Oedogonium platygynum var. *osiliae* Skuja, Acta Horti Univ. Latv. **4**: 34. 1930.

Dioecious, nannandrous, gynandrosporous and idioandrosporous; oogonia 1 or 2, depressed-obovoid, with 7–12 (more often 8) rounded projections arranged in a whorl around the middle, operculate, division inframedian; oospore depressed- or subdepressed-globose, not quite filling oogonium; spore-wall smooth; suffultory cell sometimes tumid; androsporangia 1–3; vegetative cell evidently capitellate; terminal cell apically obtuse; dwarf male unicellular, obovoid, small, on oogonium; vegetative cell 5–11 by 14–50 μ; oogonium 20–30 by 16–24 μ; oospore 16–24 by 13–20 μ; androsporangium 6–8 by 7–8 μ; dwarf male 4–6 by 8–12 μ.

TYPE LOCALITY: Sweden.
DISTRIBUTION: Massachusetts, New Jersey, Pennsylvania, Minnesota, Florida.
PLATE 27. *f. 432.*

216. **Oedogonium ambiceps** (Jao) Tiffany, sp. nov.

Oedogonium platygynum var. *ambiceps* Jao, Rhodora **36**: 208. 1934.

Dioecious, nannandrous, gynandrosporous; oogonium solitary, depressed-globose, with 8–10 long rounded projections arranged in a whorl about the middle, operculate, division infra-

median, margin undulate or straight; oospore subglobose to globose, sometimes with low projections like those of the oogonium, quite or rarely nearly filling the oogonium exclusive of the projections; spore-wall smooth; androsporangia 1 or 2, subepigynous or subhypogynous; vegetative cell distinctly capitellate at both ends, 9–13 by 22–42 μ; oogonium 32–38 by 22–29 μ; oospore 19–26 by 19–23 μ; androsporangium 11–13 by 3–4 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 28. *f. 440*.

217. **Oedogonium rigidum** Hirn, Acta Soc. Sci. Fenn. **27**: 237. 1900.

Dioecious, nannandrous, gynandrosporous; oogonium 1, obovoid-globose, operculate, division superior; oospore globose, nearly filling oogonium; spore-wall smooth, often thick; androsporangia 1 or 2, epigynous, subepigynous or hypogynous; vegetative cell broadly capitellate; terminal cell obtuse; dwarf male curved, on oogonium, antheridium exterior, 1–?; vegetative cell 12–16 by 38–58 μ; oogonium 35–43 by 35–48 μ; oospore 32–38 by 32–38 μ; androsporangium 10–11 by 11–12 μ; dwarf male stipe 7–9 by 18–22 μ; antheridium 5–7 by 6–7 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Ohio, Florida, Oklahoma.
PLATE 28. *f. 446, 447*.

218. **Oedogonium Taftii** Tiffany.

Oedogonium subglobosum Taft, Bull. Torrey Club. **62**: 289. 1935. Not *O. subglobosum* Tiff. 1934.

Dioecious, nannandrous, (?) idioandrosporous; oogonia 2–10 (rarely single), globose to subglobose, with superior operculum; oospore subglobose, quite filling the oogonium; spore-wall smooth; vegetative cell capitellate; suffultory cell sometimes enlarged; basal cell elongate; dwarf male slightly curved, on the oogonium; antheridia 1 or 2, exterior; vegetative cell 13–20 by 48–83 μ; suffultory cell 23–33 by 39–43 μ; oogonium 43–50 by 40–50 μ; oospore 40–46 by 36–40 μ; dwarf male stipe 10–13 by 23–33 μ; antheridium 6–10 by 4–7 μ.

TYPE LOCALITY: Oklahoma.
DISTRIBUTION: Oklahoma.
PLATE 28. *f. 454–456*.

219. **Oedogonium Collinsii** Tiffany, sp. nov.

Oedogonium hians var. *megasporum* Jao, Rhodora **38**: 68. 1936.

Dioecious, nannandrous, idioandrosporous; oogonia 1–7, subglobose, operculate, division superior; oospore globose, rarely subglobose, nearly filling or filling oogonium transversely; spore-wall smooth and thick; androsporangia 1–3–?; suffultory cell swollen; dwarf male slightly curved, attached to suffultory cell; antheridium exterior; vegetative cell capitellate; basal cell tumid; terminal cell obtuse; vegetative cell 11–19 by 64–102 μ; suffultory cell 35–38 by 64–74 μ; oogonium 45–55 by 48–63 μ; oospore 44–48 by 44–58 μ; androsporangium 19–20 by 22–26 μ; dwarf male stipe 11–13 by 39–45 μ; antheridium 8–10 by 6–8 μ.

TYPE LOCALITY: Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 29. *f. 459, 460*.

220. **Oedogonium michiganense** Tiff. Bot. Gaz. **83**: 205. 1927.

Dioecious, nannandrous, gynandrosporous; oogonia 1–7, globose to ellipsoid-globose (rarely subglobose), operculate, division at the upper extremity of the oogonium; oospore globose, filling the oogonium or not; outer layer of spore-wall smooth, the middle with 12–24 crenulate, sometimes anastomosing, longitudinal ribs, the inner smooth; suffultory cell enlarged; vegetative cell broadly capitellate; basal cell elongate; terminal cell, occasionally oogonium, apically obtuse; dwarf male a little curved, on suffultory cell, antheridium interior; vegetative cell 12–24 by 80–160 μ; suffultory cell 32–48 by 64–80 μ; oogonium 50–64 by 50–80 μ;

oospore 44–60 by 44–60 μ; androsporangium 16–20 by 16–20 μ; dwarf male 14–20 by 40–56 μ; basal cell 18–20 by 70–100 μ.

TYPE LOCALITY: Douglas Lake, Michigan.
DISTRIBUTION: Michigan.
PLATE 29. *f. 457, 458.*

221. **Oedogonium praticolum** Transeau, Am. Jour. Bot. **1**: 298. 1914.

Dioecious, nannandrous, idioandrosporous; oogonia 1–7, ellipsoid to globose-ellipsoid, often terminal, sometimes scattered; wall sometimes rather thick, operculate, division supreme, lid small and deciduous; oospore ellipsoid to globose-ellipsoid, quite filling the oogonium, its wall smooth; androsporangia 1–20; vegetative cell slightly capitellate; basal cell usually elongate; terminal cell apiculate or extended into a long hyaline seta; antheridium exterior, 1; female vegetative cell 16–26 by 65–130 μ; vegetative cell of androsporangial filament 14–22 by 56–110 μ; oogonium 48–60 by 62–74 μ; oospore 46–58 by 60–72 μ; androsporangium 20–24 by 18–22 μ; dwarf male stipe 8–14 by 21–28 μ; antheridium 6–10 by 7–12 μ.

TYPE LOCALITY: Charleston, Illinois.
DISTRIBUTION: Ohio, Illinois, Iowa.
PLATE 29. *f. 461–463.*

222. **Oedogonium supremum** Tiff. Ohio Jour. Sci. **24**: 185. 1924.

Dioecious, nannandrous, idioandrosporous; oogonia 1–4, globose or ellipsoid-globose, often terminal, operculate, division at the upper extremity of oogonium, lid often deciduous; oospore globose or ellipsoid-globose, filling oogonium; spore-wall smooth; androsporangia 1–6; vegetative cell distinctly capitellate; basal cell elongate; dwarf male broadly obovoid, unicellular, on oogonium; vegetative cell 24–32 by 60–132 μ; oogonium 66–78 by 72–90 μ; oospore 60–66 by 66–84 μ; androsporangium 26–28 by 30–40 μ; dwarf male 20–24 by 24–26 μ; basal cell 28–32 by 90–110 μ.

TYPE LOCALITY: West Lake Okoboji, Iowa.
DISTRIBUTION: Iowa.
PLATE 29. *f. 464–467.*

223. **Oedogonium wabashense** Tiff. Bot. Gaz. **83**: 203. 1927.

Dioecious, nannandrous, gynandrosporous; oogonia 2 or 3, ellipsoid or ovoid, often terminal, operculate, division supreme, lid often deciduous; oospore ellipsoid or ovoid (rarely globose), filling oogonium or not; spore-wall smooth; androsporangia 1–3, subepigynous; vegetative cell capitellate; basal cell elongate; dwarf male on oogonium; antheridia 1–?; vegetative cell 12–20 by 36–64 μ; oogonium 36–42 by 44–60 μ; oospore 34–38 by 40–55 μ; androsporangium 12–16 by 10–20 μ; dwarf male stipe 12–16 by 24–40 μ; antheridium 7–12 by 6–10 μ; basal cell 18–20 by 40–64 μ.

TYPE LOCALITY: Vincennes, Indiana.
DISTRIBUTION: Indiana, Ohio, Florida.
PLATE 28. *f. 451, 452.*

224. **Oedogonium suborbiculare** Jao, Rhodora **38**: 69. 1936.

Dioecious, macrandrous; oogonia 1–10, subglobose or ellipsoid-globose, pore superior; oospore globose, sometimes subglobose, not filling or nearly filling the oogonium; spore-wall of three layers, the outer and inner smooth, the median scrobiculate, the scrobiculations more or less concentrically arranged and varying in diameter; suffultory cell sometimes slightly enlarged; antheridia 1–3, sperms 2, division horizontal; basal cell elongate; vegetative cells capitellate, the female 22–32 by 112–218 μ, male 19–22 by 130–210 μ; suffultory cell 22–38 by 118–200 μ; oogonium (with prolongations) 64–74 by 77–114 μ; oospore 54–67 by 54–67 μ; antheridium 16–18 by 13–16 μ; basal cell 25–32 by 166–180 μ.

TYPE LOCALITY: Near Woods Hole, Massachusetts.
DISTRIBUTION: Massachusetts.
PLATE 18. *f. 250, 251.*

225. **Oedogonium completum** (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934.

Oedogonium obtruncatum var. *completum* Hirn, Acta Soc. Sci. Fenn. **27**: 285. 1900.

Dioecious, nannandrous, gynandrosporous; oogonia 1–3, broadly ellipsoid, operculate, division supreme, operculum small and deciduous; oospore broadly ellipsoid, nearly filling oogonium; spore-wall smooth; androsporangia 1–5, hypogynous or epigynous or subepigynous; terminal cell sometimes setiform; vegetative cell capitellate, 18–22 by 66–150 μ; oogonium 55–60 by 63–75 μ; oospore 53–58 by 61–73 μ; androsporangium 20–22 by 19–22 μ.

TYPE LOCALITY: Asia.
DISTRIBUTION: Florida.
PLATE 25. *f. 404–406.*

226. **Oedogonium latviense** (Tiff.) Tiff. Ohio Jour. Sci. **34**: 325. 1934.

Oedogonium spirale var. *latviense* Tiff. Ohio Jour. Sci. **29**: 75. 1929.

Dioecious; nannandrous, idioandrosporous; oogonium 1, subglobose or ovoid-globose, pore supramedian to superior; oospore globose or subglobose, not or nearly filling oogonium; spore-wall double, the outer layer with 5–6 spirally arranged ribs, the inner smooth; dwarf male a little curved, on suffultory cell, antheridium exterior, 1; vegetative cell 16–22 by 65–120 μ; oogonium 49–60 by 50–65 μ; oospore (without ribs) 35–45 by 35–45 μ; dwarf male stipe 10–12 by 15–20 μ.

TYPE LOCALITY: Latvia.
DISTRIBUTION: Puerto Rico.
PLATE 31. *f. 500.*

227. **Oedogonium pusillum** Kirchner, Krypt.-Fl. Schles. **2**[1]: 59. 1878; Tiffany, char. emend.

? *Oedogonium excisum* Wittr. & Lundell; Nordst. Acta Univ. Lund **16**[4]: 13. 1880.
Oedogonium africanum Lagerh. Nuova Notar. **4**: 155. 1893.
Oedogonium Klebahnii Lemmerm. Abh. Nat. Ver. Bremen **12**: 509. 1893.

Monoecious; oogonium 1 (rarely 2), subbiconic-ellipsoid or subbiconic-globose, seen from above circular, margin even, operculate, division wide (up to 2.5 μ); oospore ellipsoid or globose, generally constricted at the middle, not quite filling oogonium; spore-wall smooth; antheridia 1 or 2, subepigynous, sperm 1 (?); basal cell subhemispheric; terminal cell obtuse or obtusely conic; vegetative cell 3–6 by 10–60 μ; oogonium 14–16 by 15–25 μ; oospore 11–13 by 13–15 μ; antheridium 3–4 by 5–6 μ; basal cell 7–8 by 7–8 μ.

TYPE LOCALITY: Germany and Michigan.
DISTRIBUTION: Massachusetts, Ohio, Michigan, Illinois, Iowa, Oklahoma, Florida; Canada.
PLATE 19. *f. 287.*
NOTE: The completed description is made possible through material collected in Michigan by Dr. C. E. Taft.

SPECIES INCOMPLETELY DESCRIBED

228. **Oedogonium Oryzae** Wittr. Oefv. Sv. Vet.-Akad. Förh. **33**[6]: 51. 1876.

Oogonia 1 or 2, scarcely tumid, subobovoid or subcylindric, pore superior; oospore of same form as oogonium, nearly filling it or sometimes enlarging it; spore-wall smooth; basal cell elongate; terminal cell acuminate; vegetative cell 24–39 by 36–120 μ; suffultory cell 45 by 56–90 μ; single oogonium or upper series 45–55 by 65–95 μ; lower series 43–53 by 45–57 μ; oospore 41–51 by (44)60–80 μ.

TYPE LOCALITY: Italy.
DISTRIBUTION: Iowa, North Carolina, Mississippi.
PLATE 7. *f. 81, 82.*

229. **Oedogonium consociatum** Collins & Hervey, Proc. Am. Acad. **53**: 36. 1917.

Dioecious, macrandrous (?); oogonium single, globose to depressed-globose, operculate, division median to superior, narrow but distinct; oospore globose to depressed-globose, filling oogonium; spore-wall smooth; basal cell depressed-globose; vegetative cell, 6–12(20) by 6–50 μ; oogonium 27–28 by 26–28 μ; oospore 26 by 24–26 μ; basal cell 20–24 by 12–16 μ.

TYPE LOCALITY: Bermuda.
DISTRIBUTION: Bermuda.
PLATE 7. *f. 80*.

230. **Oedogonium sancti-thomae** Wittr. & Cleve; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 40. 1874.

Dioecious; oogonia 1–3, pyriform, operculate, division superior; oospore pyriform-obovoid, not quite filling oogonium; spore-wall smooth; basal cell subhemispheric; terminal cell very slender, subhyaline; vegetative cell 7–15 by 16–88 μ; oogonium 28–33 by 36–50 μ; oospore 25–30 by 28–35 μ; basal cell 14–23 by 8–12 μ.

TYPE LOCALITY: St. Thomas, West Indies.
DISTRIBUTION: Massachusetts, Ohio, Michigan, Mississippi, Oklahoma; St. Thomas.
PLATE 19. *f. 277*.

231. **Oedogonium tapeinosporum** Wittr. Nova Acta Soc. Sci. Upsal. III. **9**^{3}: 36. 1874.

Oedogonium tapeinosporum var. *angolense* W. & G. West, Jour. Bot. **35**: 5. 1897.

Oogonia 1 or 2, depressed-globose, operculate, division median, distinct; oospore depressed-globose, not (rarely nearly) filling oogonium; spore-wall smooth; basal cell subhemispheric; terminal cell obtuse; vegetative cell (2–)3–5 by 10–40 μ; oogonium 14–19 by (14–)17–23 μ; oospore 13–16 by 8–14 μ; basal cell 8–14 by 5–7 μ.

TYPE LOCALITY: Brazil.
DISTRIBUTION: Massachusetts, Michigan, Iowa, Florida, Oklahoma; British Columbia.
PLATE 19. *f. 276*.

232. **Oedogonium flexuosum** Hirn, Acta Soc. Sci. Fenn. **27**: 313. 1900.

Dioecious; oogonium 1, obovoid or obovoid-globose, operculate, division superior; oospore same form as oogonium and filling it; spore-wall smooth; filament irregularly curved; vegetative cell 15–18 by 12–32 μ; oogonium 29–34 by 29–43 μ; oospore 27–32 by 27–37 μ; basal cell 32 by 16 μ.

TYPE LOCALITY: Spain.
DISTRIBUTION: Puerto Rico.
PLATE 7. *f. 79*.

233. **Oedogonium fonticola** A. Br.; Kütz. Sp. Alg. 368. 1849.

Oedogonium rhodosporum Wittr. Nova Acta Soc. Sci. Upsal. III. 9^3: 47. 1876.

Dioecious; oogonia 1 or 2, obovoid or globose-obovoid, operculate, division superior; oospore obovoid-ellipsoid or subglobose, nearly or quite filling oogonium; spore-wall smooth; vegetative cell 16–32 by 12–70 μ; oogonium 36–43(45) by 43–56 μ; oospore 34–41(43) by 40–49 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Ohio, Iowa, Indiana, Mississippi.
PLATE 23. *f. 363*.

234. **Oedogonium poecilosporum** Nordst. & Hirn; Hirn, Acta Soc. Sci. Fenn. **27**: 298. 1900.

Oogonia 1 or 2, ellipsoid to depressed-globose (sometimes globose to subglobose), operculate, division median, wide (2–3.5 μ); oospore of the same form as the oogonium and nearly filling it; spore-wall smooth; terminal cell apically obtuse; vegetative cell 6–8 by 20–47 μ; oogonium 24–28 by 25–28 μ; oospore 23–26 by 21–28 μ.

TYPE LOCALITY: Africa.
DISTRIBUTION: Michigan.
PLATE 19. *f. 286.*

235. **Oedogonium giganteum** Kütz. Phyc. Germ. 200. 1845; Wittr. Nova Acta Soc. Sci. Upsal. III. **9**[3]: 42. 1874.

Dioecious (?), macrandrous; oogonium 1, cylindric-obovoid, pore superior; oospore cylindric-ellipsoid or subellipsoid, nearly filling oogonium; spore-wall in three layers, the outer and inner smooth, the middle with 25–30 longitudinal rows of pits; vegetative cell 30–50 by 60–225 μ; suffultory cell 40–60 by 60–210 μ; oogonium 53–69 by 67–106 μ; oospore 51–65 by 103 μ.

TYPE LOCALITY: Germany.
DISTRIBUTION: Iowa, Oklahoma.
PLATE 7. *f. 83.*

236. **Oedogonium inconspicuum** Hirn, Acta Soc. Faun Fl. Fenn. **11**[6]: 23. 1895.

? *Oedogonium minutissimum* Grun.; Rab. Fl. Eur. Alg. **3**: 352. 1868; Hansg. Beih. Bot. Centr. **18**[2]: 436. 1905.

(Dioecious, macrandrous ?) oogonia 1–4, depressed- or subpyriform-globose, operculate, division median, narrow; oospore depressed-globose (rarely ovoid), filling the inflated part of oogonium; spore-wall smooth; vegetative cell 3–5 by 20–34 μ; oogonium 13–18 by (13)17–23 μ; oospore 12–17 by 8–12 μ; basal cell 10–18 by 4–8 μ.

TYPE LOCALITY: Austria.
DISTRIBUTION: Ohio, Indiana, Florida; Puerto Rico.
PLATE 19. *f. 288, 289.*

EXTRA-LIMITAL SPECIES

The keys under the three genera provide for the identification of extra-limital species and varieties, since their existence in North America is possible. For descriptions and illustrations of these species and varieties, so far as they were known in 1930, the reader may consult Tiff. Oedogon. Monog. (1930). Additional species, described since 1930, and new names proposed since that date are listed below, with citations to a description under another name or to the place of original publication.

BULBOCHAETE GLABRA (Hirn) Tiff. Ohio Jour. Sci. **34**: 323. 1934. *Bulbochaete sessilis* f. *glabra* Hirn; Tiff. Oedog. Monog. 39. 1930.

BULBOCHAETE LITORALIS (Hirn) Tiff. Ohio Jour. Sci. **34**: 323. 1934. *Bulbochaete rhadinospora* var. *litoralis* Hirn; Tiff. Oedog. Monog. 47. 1930.

BULBOCHAETE NORVEGICA (Wittr.) Tiff. Ohio Jour. Sci. **34**: 323. 1934. *Bulbochaete tenuis* var. *norvegica* (Wittr.) Hirn; Tiff. Oedog. Monog. 44. 1930.

BULBOCHAETE REGALIS (Wittr.) Tiff. Ohio Jour. Sci. **34**: 323. 1934. *Bulbochaete imperialis* var. *regalis* Wittr.; Tiff. Oedog. Monog. 49. 1930.

BULBOCHAETE WORONICHINI Tiff. Ohio Jour. Sci. **34**: 323. 1934. *Bulbochaete Brebissonii* var. *minor* Woronichin; Tiff. Oedog. Monog. 34. 1930.

OEDOGONIUM ACMANDRIUM var. STICTOSPERMUM Skuja, Acta Horti Univ. Latv. **4**: 30. 1930.

OEDOGONIUM ACUMINATUM (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium macrandrium* f. *acuminatum* Hirn; Tiff. Oedog. Monog. 151. 1930.

OEDOGONIUM BORGEI (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium monile* f. *Borgei* Hirn; Tiff. Oedog. Monog. 154. 1930.

OEDOGONIUM BREVICINGULATUM Jao, Papers Mich. Acad. 20: 57. 1935.

OEDOGONIUM CALCAREUM var. AFRICANUM P. Frémy, Bull. Soc. Hist. Nat. Afr. Nord **21**: 74. 1930.

Oedogonium columbianum (G. West) Tiffany, sp. nov. *Oedogonium fabulosum* var. *columbianum* G. West, Mém. Soc. Neuchat. Sci. Nat. **5**: 1048. 1914; Tiff. Oedog. Monog. 84. 1930.

OEDOGONIUM COSTATOSPORUM Jao, Papers Mich. Acad. **19**: 88. 1934.

OEDOGONIUM CYMATOSPORUM var. CHUNGKINGENSE Jao, Papers Mich. Acad. **19**: 91. 1934.

OEDOGONIUM EMINENS (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium monile* var. *eminens* Hirn; Tiff. Oedog. Monog. 154. 1930.

OEDOGONIUM EXCAVATUM Jao, Papers Mich. Acad. **19**: 90. 1934.

OEDOGONIUM EXMONILE Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium monile* f. *victoriense* G. West; Tiff. Oedog. Monog. 154. 1930.

OEDOGONIUM EXOSTRIATUM Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium oelandicum* f. *minus* Borge; Tiff. Oedog. Monog. 142. 1930.

OEDOGONIUM EXOTICUM (Hirn) Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium Cleveanum* f. *exoticum* Hirn; Tiff. Oedog. Monog. 138. 1930.

OEDOGONIUM HERJEDALICUM Cedergr. Ark. Bot. **25A**[4]: 95. 1932.

OEDOGONIUM ILSTERI Skuja, Acta Horti Univ. Latv. **7**: 59. 1934.

OEDOGONIUM INFRAMEDIALE Jao, Papers Mich. Acad. **20**: 59. 1935.

OEDOGONIUM INTERMEDIUM var. SZECHWANENSE Jao, Papers Mich. Acad. **19**: 89. 1934.

OEDOGONIUM MAXIMUM W. & G. West. *Oedogonium fabulosum* var. *maximum* Hirn; Tiff. Oedog. Monog. 83. 1930.

OEDOGONIUM OBLONGUM var. FUSIFORME Jao, Papers Mich. Acad. **20**: 60. 1935.

OEDOGONIUM OPERCULATUM Tiff. Trans. Am. Micr. Soc. **55**: 2. 1936.

OEDOGONIUM ORIENTALE Jao, Papers Mich. Acad. **19**: 85. 1934.

OEDOGONIUM PARAGUAYENSE Tiff. Ohio Jour. Sci. **34**: 324. 1934. *Oedogonium fabulosum* var. *punctatum* Lemmerm.; Tiff. Oedog. Monog. 84. 1930.

OEDOGONIUM PEIPINGENSE Jao, Papers Mich. Acad. **20**: 58. 1935.

OEDOGONIUM PORRECTUM var. AFRICANUM Nygaard, Trans. Roy. Soc. S. Afr. **20**: 136. 1932.

OEDOGONIUM PSEUDOSPIRALE Nygaard, Trans. Roy. Soc. S. Afr. **20**: 136. 1932.

OEDOGONIUM RECTANGULARE (Rich) Tiff. Ohio Jour. Sci. **34**: 326. 1934. *Oedogonium concatenatum* var. *rectangulare* Rich; Tiff. Oedog. Monog. 137. 1930.

OEDOGONIUM ROBUSTUM (W. & G. West) Tiff. Ohio Jour. Sci. **34**: 324. 1934. *Oedogonium ragile* var. *robustum* (W. & G. West) Tiff.; Tiff. Oedog. Monog. 75. 1930.

OEDOGONIUM SINENSE Li, Ohio Jour. Sci. **33**: 152. 1933.

OEDOGONIUM SPIRALIDENS Jao, Papers Mich. Acad. **19**: 84. 1934.

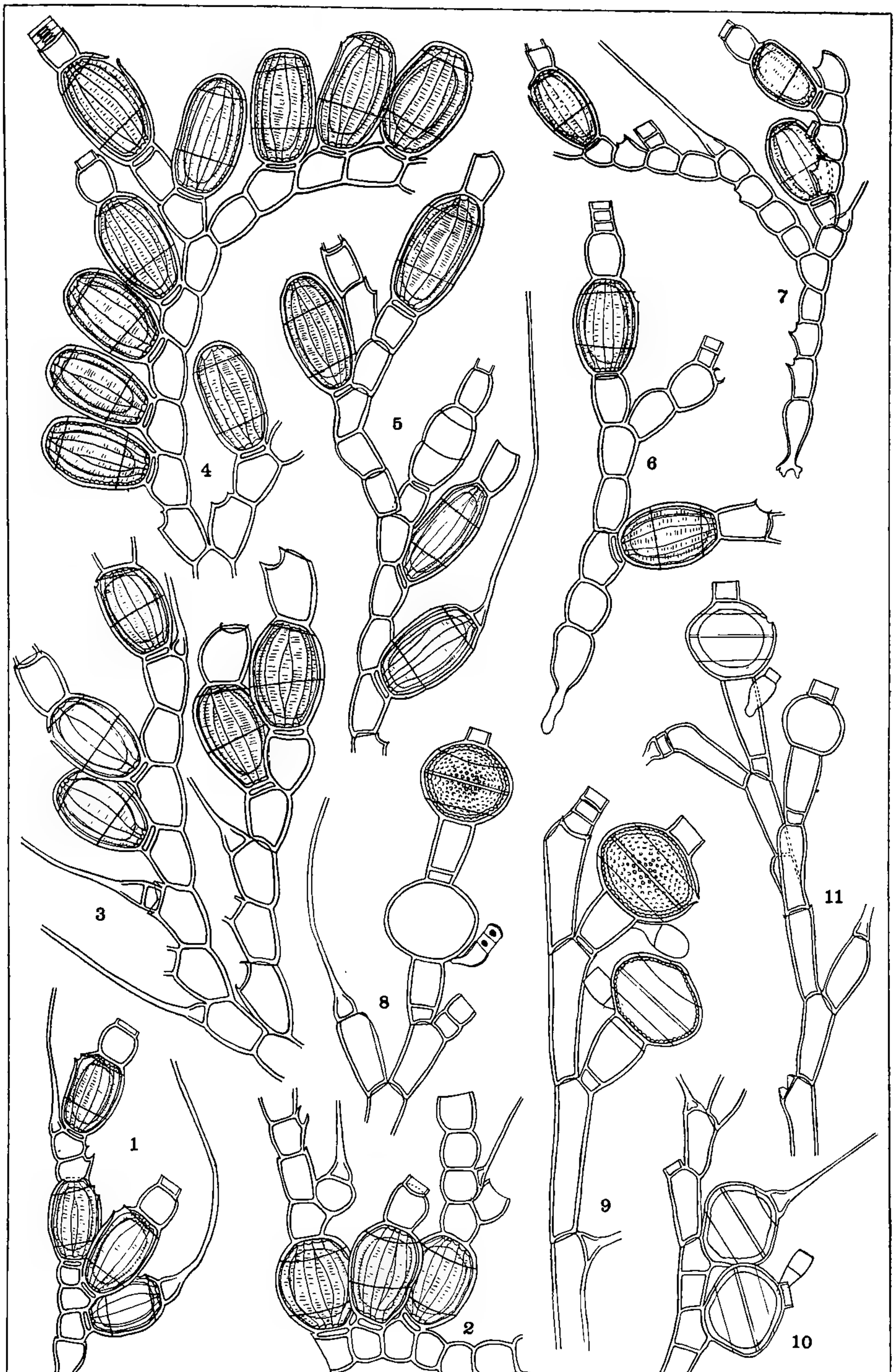
OEDOGONIUM STEPHENSIAE Tiff. Trans. Am. Micr. Soc. **55**: 2. 1936.

OEDOGONIUM SUBGLOBOSUM (Wittr.) Tiff. Ohio Jour. Sci. **34**: 325. 1934. *Oedogonium Hystrix* var. *subglobosum* Wittr.; Tiff. Oedog. Monog. 121. 1930.

Plate 1

Fig. 1. *Bulbochaete monile* Wittr. & Lundell.
Fig. 2. *Bulbochaete robusta* (Hirn) Tiff.
Fig. 3. *Bulbochaete Debaryana* Wittr. & Lundell.
Fig. 4. *Bulbochaete mirabilis* Wittr.
Fig. 5. *Bulbochaete mirabilis* var. *gracilis* (Pringsh.) Hirn.
Fig. 6. *Bulbochaete basispora* Wittr. & Lundell
Fig. 7. *Bulbochaete nana* Wittr.
Fig. 8. *Bulbochaete scrobiculata* Tiff.
Fig. 9. *Bulbochaete Brebissonii* Kütz.
Fig. 10. *Bulbochaete angulosa* Wittr. & Lundell.
Fig. 11. *Bulbochaete elatior* Pringsh.

(Figs. 1, 3–5, 7, 9–11 redrawn from Hirn.)

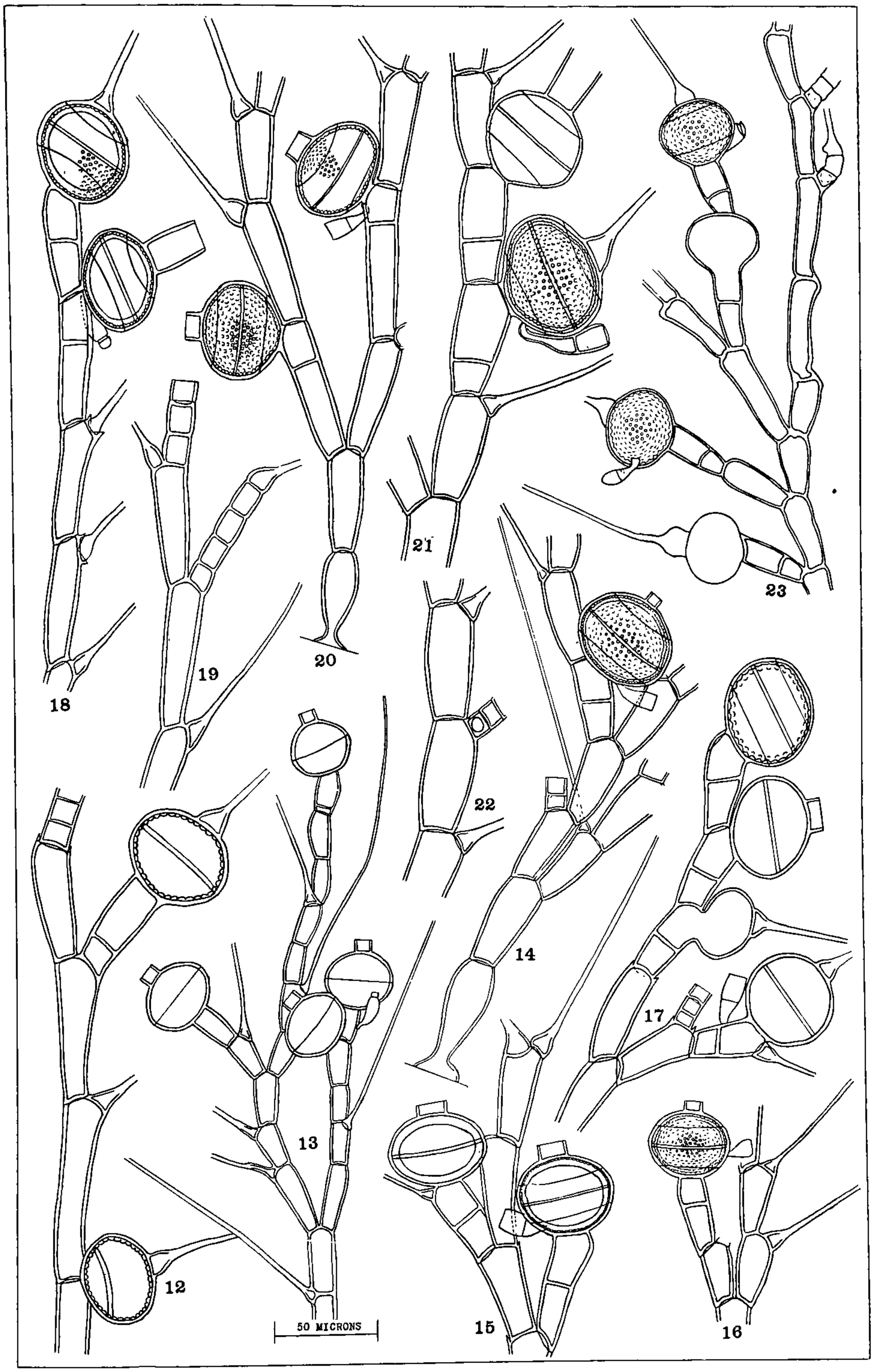


BULBOCHAETE

Plate 2

Fig. 12. *Bulbochaete Furberae* Collins.
Fig. 13. *Bulbochaete minuta* W. & G. West.
Fig. 14. *Bulbochaete intermedia* De Bary.
Fig. 15. *Bulbochaete intermedia* var. *depressa* Wittr.
Fig. 16. *Bulbochaete suberecta* (Collins) Tiff.
Fig. 17. *Bulbochaete crenulata* Pringsh.
Figs. 18, 19. *Bulbochaete polyandria* Cleve.
Fig. 20. *Bulbochaete Nordstedtii* Wittr.
Figs. 21, 22. *Bulbochaete congener* Hirn.
Fig. 23. *Bulbochaete depressa* Taft.

(Fig. 12 redrawn from Lewis; 13, from West; 23, after Taft.)

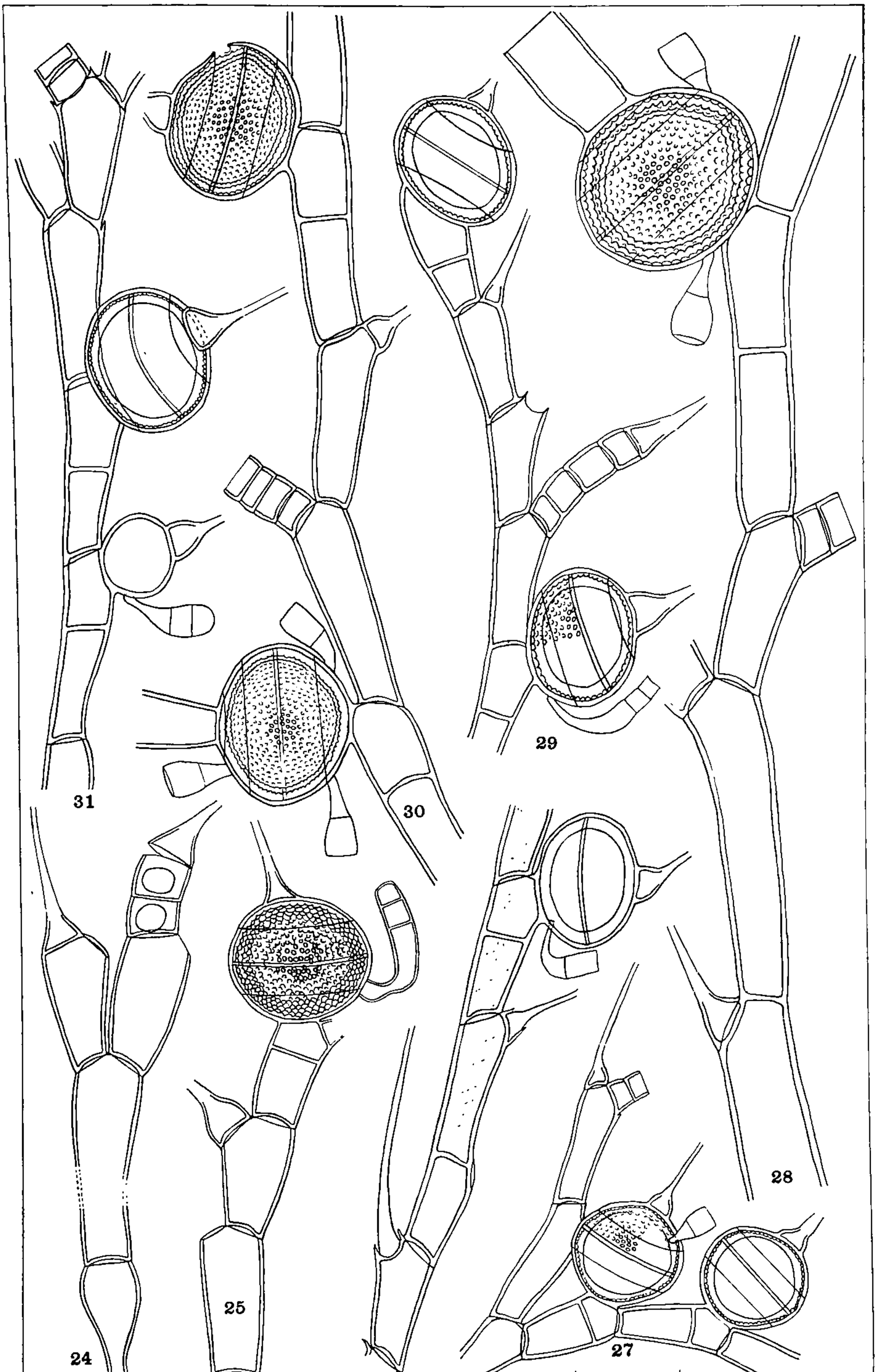


BULBOCHAETE

Plate 3

Figs. 24, 25. *Bulbochaete gigantea* Pringsh.
Fig. 26. *Bulbochaete obliqua* Lundell.
Fig. 27. *Bulbochaete sessilis* Wittr.
Fig. 28. *Bulbochaete alabamensis* Transeau & Brown.
Fig. 29. *Bulbochaete crassa* Pringsh.
Fig. 30. *Bulbochaete seligera* (Roth) Ag.
Fig. 31. *Bulbochaete valida* Wittr.

(Figs. 26, 27, 31 redrawn from Hirn.)

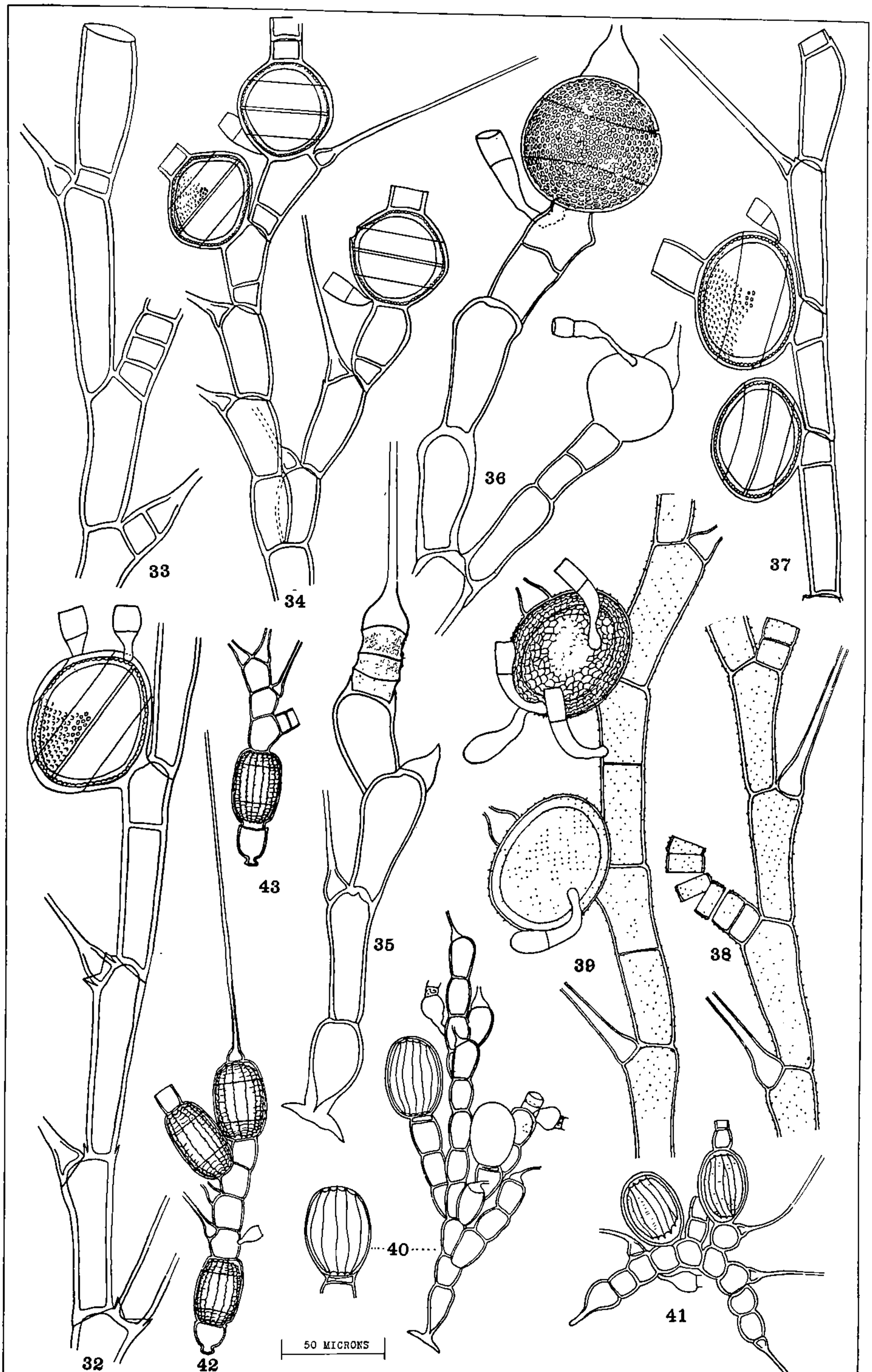


BULBOCHAETE

Plate 4

Figs. 32, 33. *Bulbochaete crassiuscula* Nordst.
Fig. 34. *Bulbochaete quadrata* Wittr.
Figs. 35, 36. *Bulbochaete alpina* Taft.
Fig. 37. *Bulbochaete dispar* Wittr.
Figs. 38, 39. *Bulbochaete praereticulata* Jao.
Fig. 40. *Bulbochaete cimarronea* Taft.
Fig. 41. *Bulbochaete pygmaea* Pringsh.
Figs. 42, 43. *Bulbochaete pygmaea* var. *erecta* Jao.

(Figs. 32–34, 37, after Hirn; 35, 36, 40 after Taft; 42, 43 after Jao.)

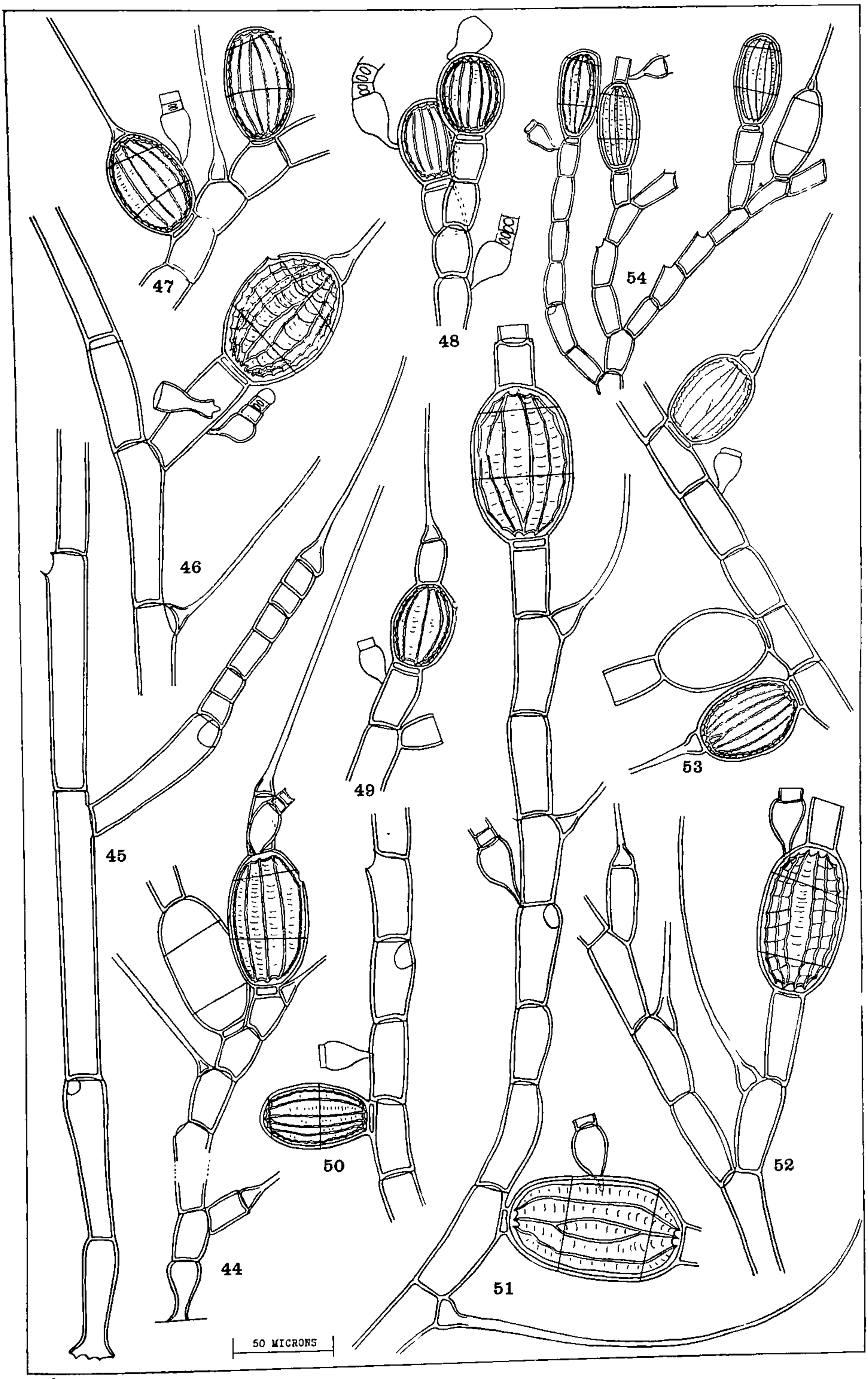


BULBOCHAETE

Plate 5

Fig. 44. *Bulbochaete minor* A. Br.
Figs. 45, 46. *Bulbochaete Bullardi* Transeau & Tiff.
Fig. 47. *Bulbochaete varians* Wittr.
Fig. 48. *Bulbochaete varians* var. *subsimplex* (Wittr.) Hirn.
Fig. 49. *Bulbochaete varians* var. *hawaiensis* Nordst.
Fig. 50. *Bulbochaete hiloensis* (Nordst.) Tiff.
Fig. 51. *Bulbochaete insignis* Pringsh.
Fig. 52. *Bulbochaete reticulata* Nordst.
Fig. 53. *Bulbochaete rectangularis* Wittr.
Fig. 54. *Bulbochaete tenuis* (Wittr.) Hirn.

(Figs. 50, 52 redrawn from Hirn.)

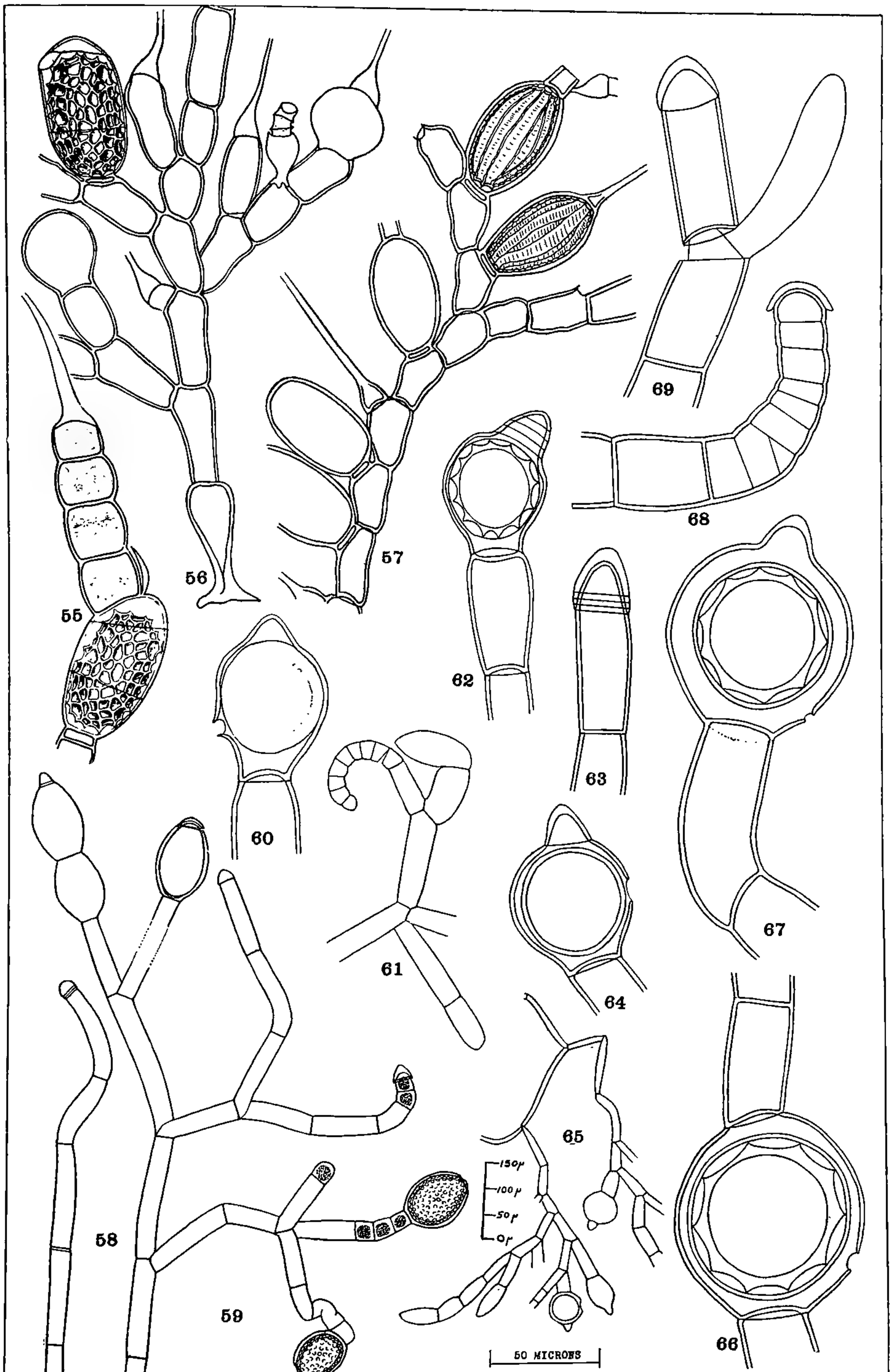


BULBOCHAETE

Plate 6

Figs. 55, 56. *Bulbochaete areolata* Taft.
Fig. 57. *Bulbochaete repanda* Wittr.
Figs. 58, 59. *Oedocladium operculatum* Tiff.
Figs. 60–62. *Oedocladium Wettsteinii* E. Knapp.
Figs. 63–65. *Oedocladium medium* I. F. Lewis.
Figs. 66–69. *Oedocladium albemarlense* I. F. Lewis.

(Figs. 55, 56, after Taft; 60–62 after Knapp; 63–65 from Tiffany after Lewis; 66–69 after Lewis.)



BULBOCHAETE, OEDOCLADIUM

Plate 7

Figs. 70–78. *Oedocladium Hazenii* I. F. Lewis. (71, escape of androspores from androsporangia; 75, sporeling with both rhizoidal and green cells of vegetative filament; 76–78, stages in germination of zoospore.)

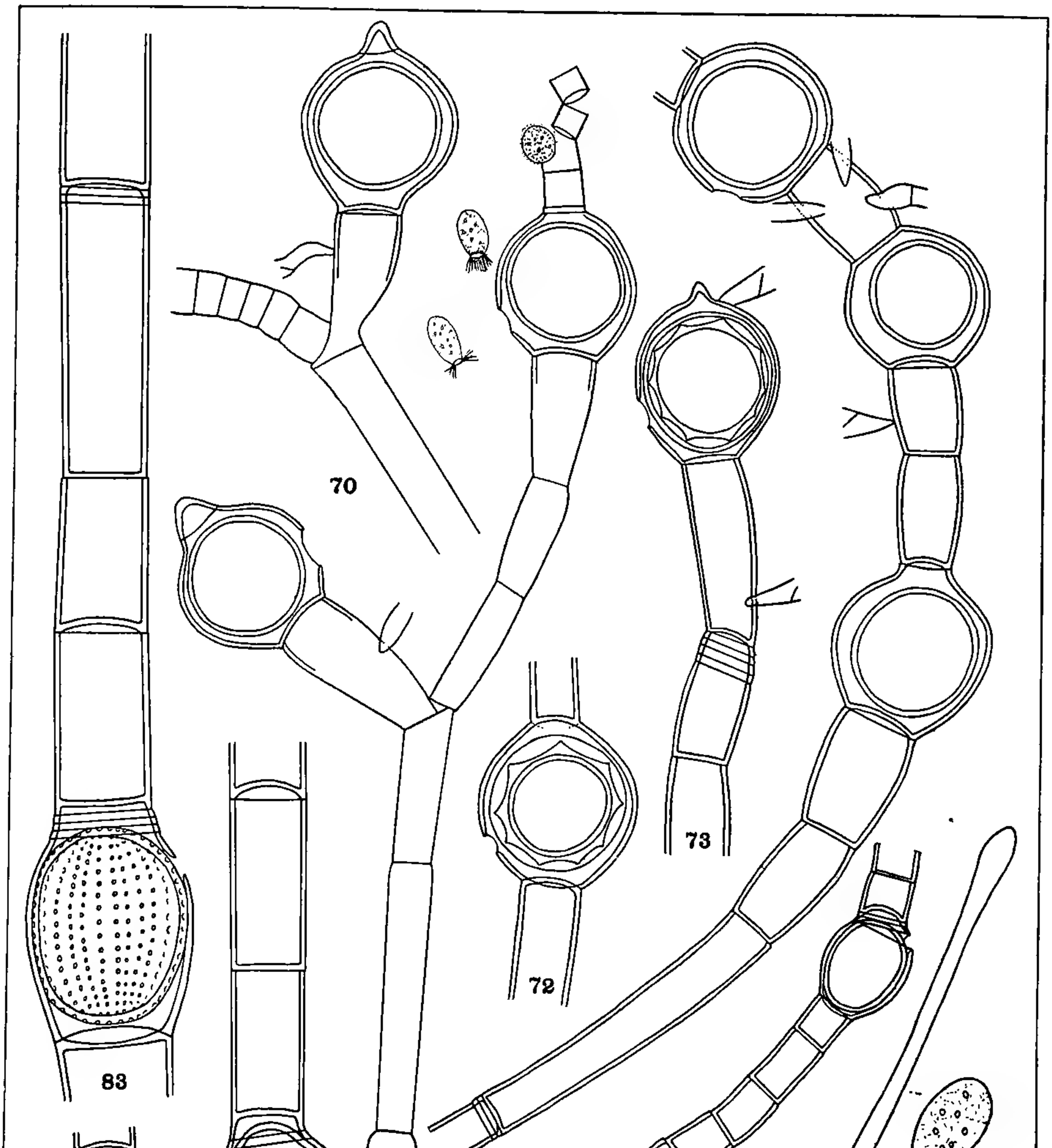
Fig. 79. *Oedogonium flexuosum* Hirn.

Fig. 80. *Oedogonium consociatum* Collins & Hervey.

Figs. 81, 82. *Oedogonium Oryzae* Wittr.

Fig. 83. *Oedogonium giganteum* Kütz.

(Figs. 70–78 from Tiffany after Lewis; 79, 81–83 redrawn from Hirn; 80 from Collins.)

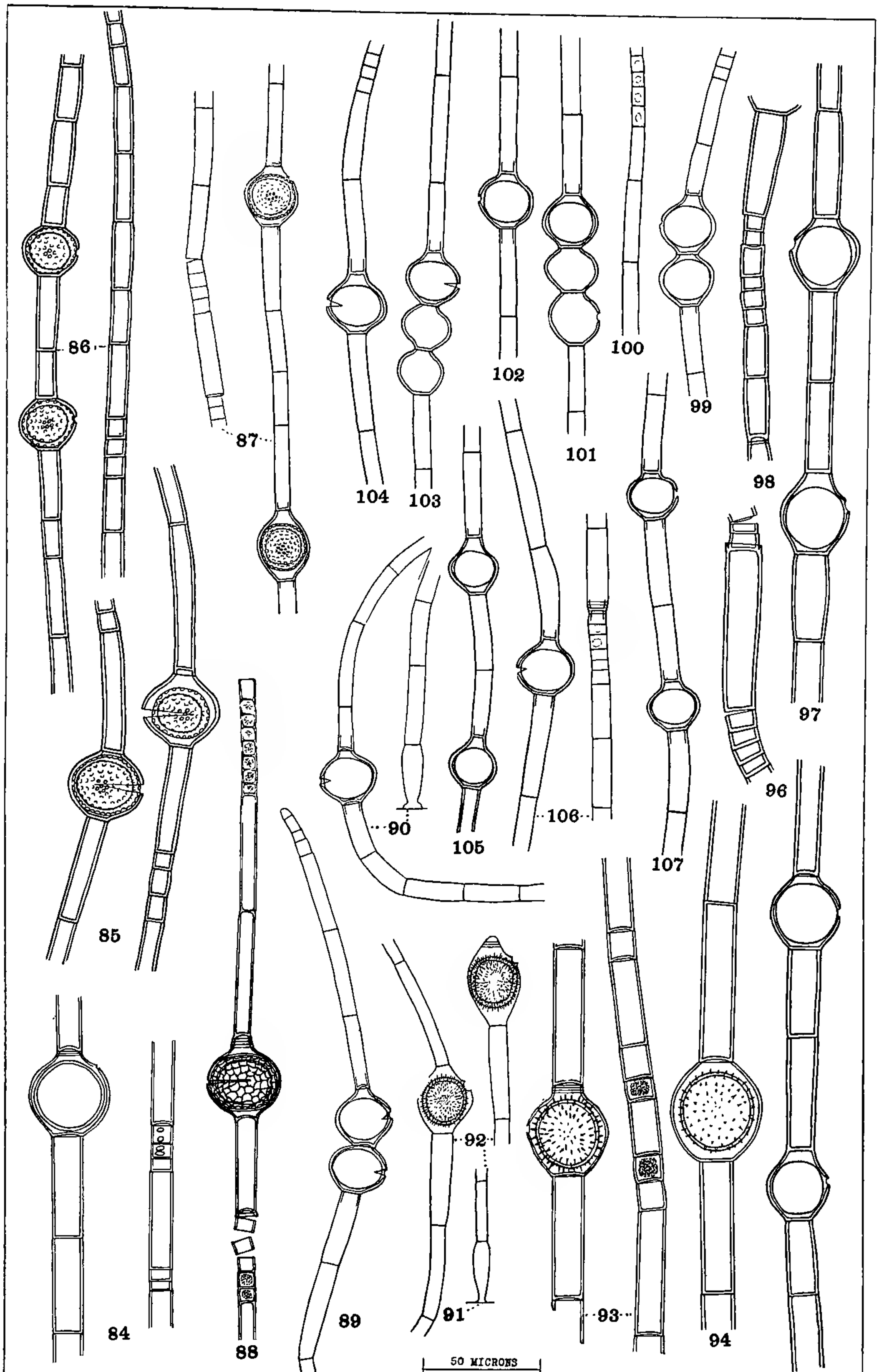


OEDOCLADIUM, OEDOGONIUM

Plate 8

Fig. 84. *Oedogonium Franklinianum* Wittr.
Fig. 85. *Oedogonium cymatosporum* Wittr. & Nordst.
Fig. 86. *Oedogonium Magnusii* Wittr.
Fig. 87. *Oedogonium moniliforme* Wittr.
Fig. 88. *Oedogonium areoliferum* (Jao) Tiff.
Figs. 89, 90. *Oedogonium curvum* Pringsh.
Figs. 91, 92. *Oedogonium santurcense* Tiff.
Fig. 93. *Oedogonium suecicum* Wittr.
Fig. 94. *Oedogonium australe* (G. West) Tiff.
Figs. 95, 96. *Oedogonium sociale* Wittr.
Figs. 97, 98. *Oedogonium plusiosporum* Wittr.
Fig. 99. *Oedogonium laeve* Wittr.
Figs. 100–102. *Oedogonium rufescens* Wittr.
Fig. 103. *Oedogonium vulgare* (Wittr.) Tiff.
Fig. 104. *Oedogonium cryptoporum* Wittr.
Fig. 105. *Oedogonium rufescens* var. *exiguum* (Elfv.) Tiff.
Figs. 106, 107. *Oedogonium rufescens* var. *Lundellii* (Wittr.) Tiff.

(Figs. 85, 86, 95–98, 106, 107 redrawn from Hirn; 88 after Jao.)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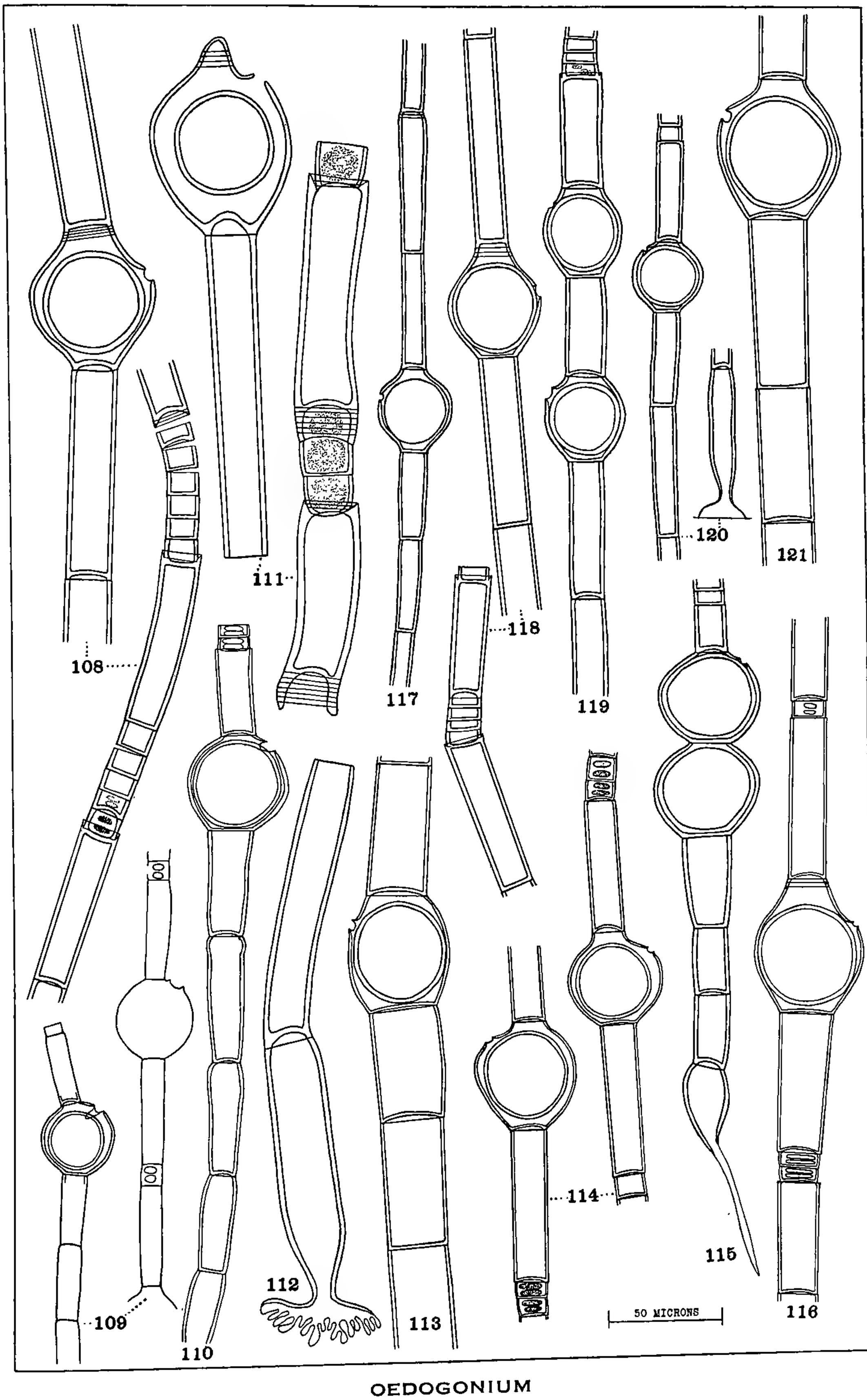
OEDOGONIUM

Plate 9

Fig. 108. *Oedogonium cardiacum* (Hassall) Wittr.
Fig. 109. *Oedogonium Hirnii* Gutw.
Fig. 110. *Oedogonium patulum* Tiff.
Figs. 111, 112. *Oedogonium glabrum* Hallas.
Fig. 113. *Oedogonium Lemmermannii* Tiff.
Fig. 114. *Oedogonium varians* Wittr. & Lundell.
Fig. 115. *Oedogonium curtum* Wittr. & Lundell.
Fig. 116. *Oedogonium tyrolicum* Wittr.
Fig. 117. *Oedogonium obsoletum* Wittr.
Fig. 118. *Oedogonium lautumniarum* Wittr.
Fig. 119. *Oedogonium intermedium* Wittr.
Fig. 120. *Oedogonium globosum* Nordst.
Fig. 121. *Oedogonium cardiacum* var. *carbonicum* Wittr.

(Figs. 108, 115, 117, 118, 120 redrawn from Hirn; 111, 112, from Hallas.)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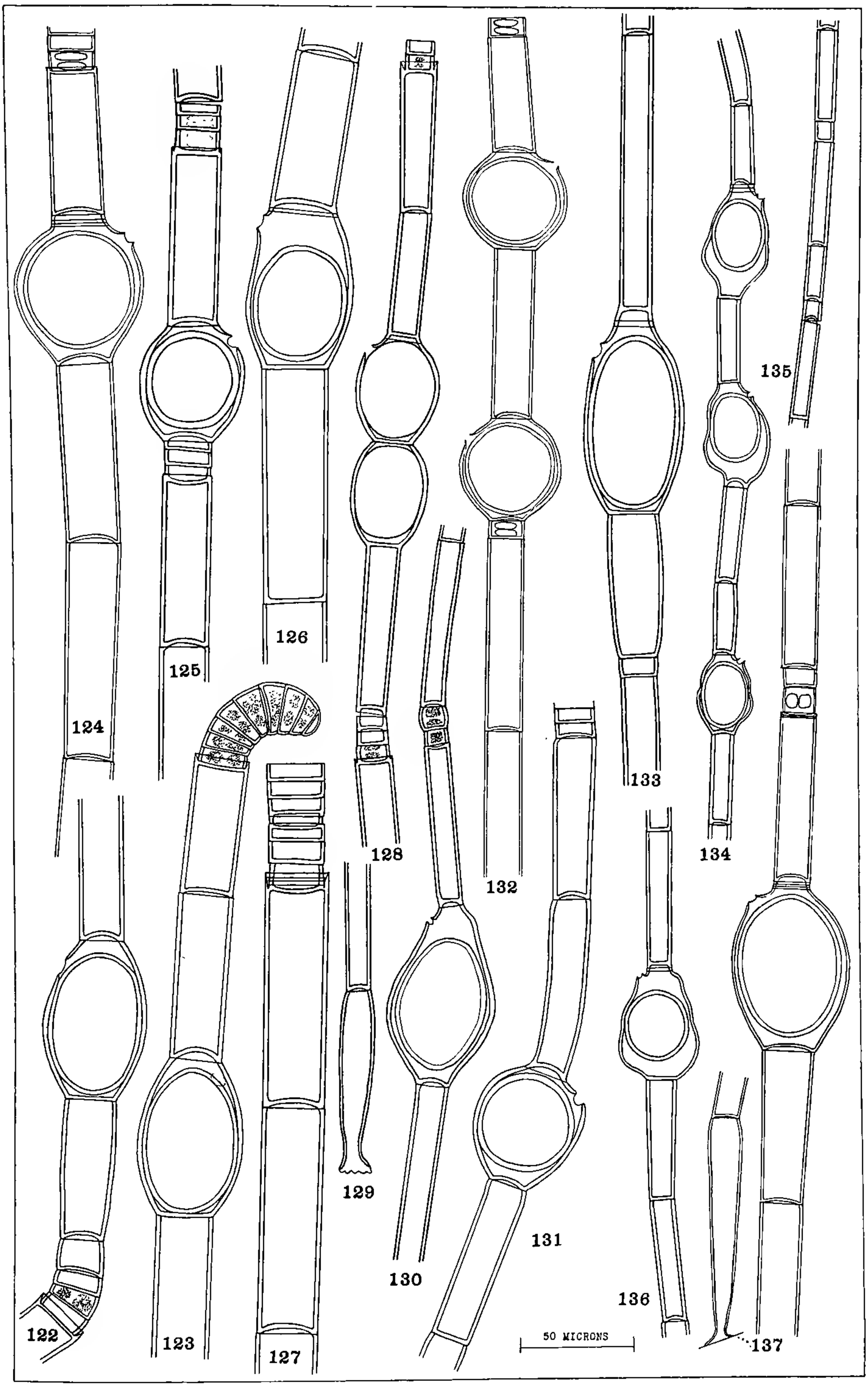
OEDOGONIUM

Plate 10

Figs. 122, 123. *Oedogonium Sodiroanum* Lagerh.
Figs. 124, 125. *Oedogonium Vaucherii* (Le Clerc) A. Br.
Figs. 126, 127. *Oedogonium biforme* Nordst.
Figs. 128, 129. *Oedogonium Richterianum* Lemmerm.
Fig. 130. *Oedogonium pseudo-Boscii* Hirn.
Fig. 131. *Oedogonium fennicum* (Tiff.) Tiff.
Fig. 132. *Oedogonium fragile* Wittr.
Fig. 133. *Oedogonium upsaliense* Wittr.
Figs. 134–136. *Oedogonium lageniforme* Hirn.
Fig. 137. *Oedogonium oviforme* (Lewin) Hirn.

(Figs. 126–129 redrawn from Hirn; 130 from Silfvenius.)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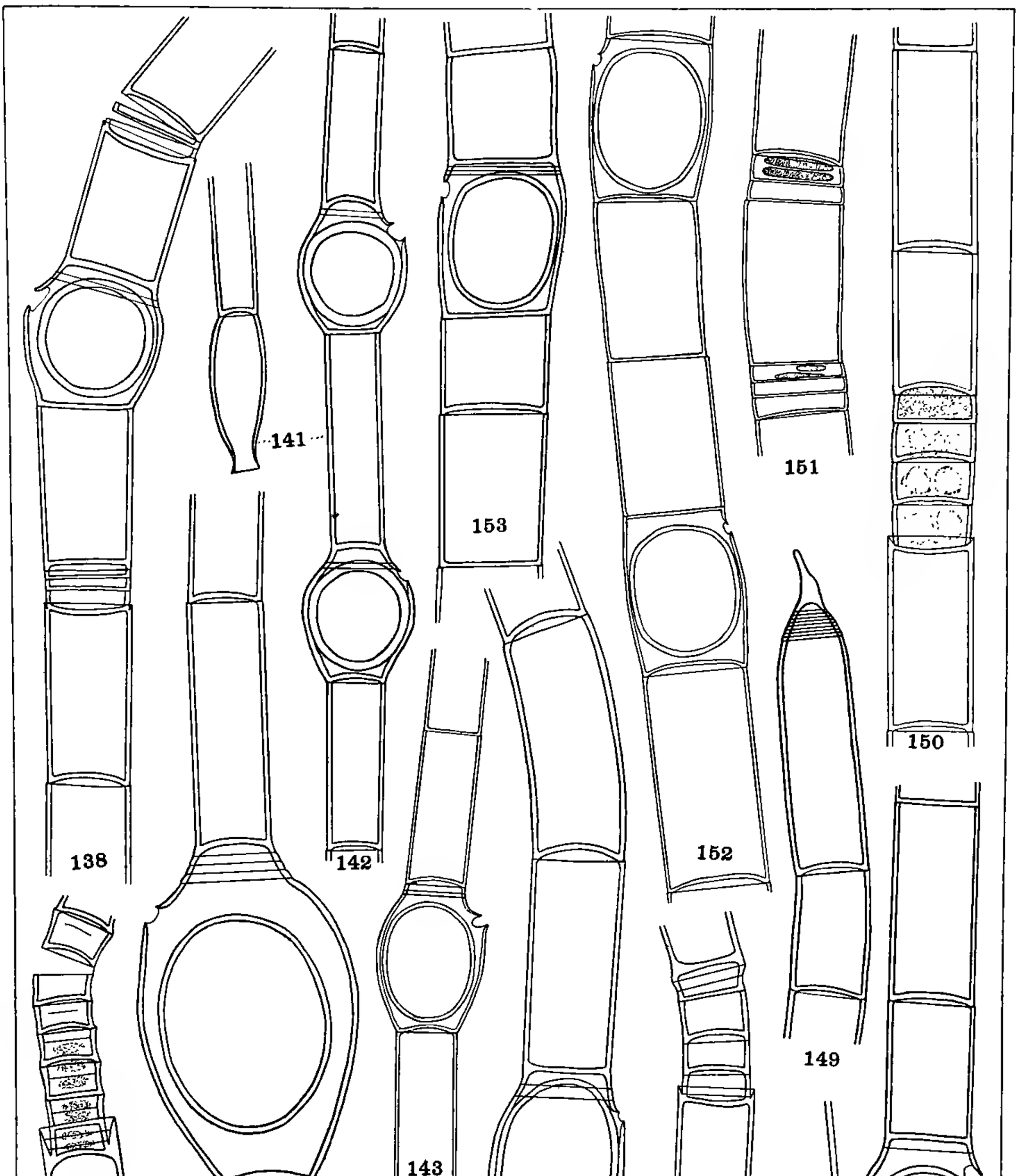
OEDOGONIUM

Plate 11

Fig. 138. *Oedogonium geniculatum* Hirn.
Figs. 139, 140. *Oedogonium rivulare* (Le Clerc) A. Br.
Figs. 141, 142. *Oedogonium plagiostomum* Wittr.
Figs. 143, 144. *Oedogonium gracilius* (Wittr.) Tiff.
Figs. 145, 146. *Oedogonium mexicanum* Wittr.
Figs. 147–150. *Oedogonium princeps* (Hassall) Wittr.
Figs. 151, 152. *Oedogonium capillare* (L.) Kütz.
Fig. 153. *Oedogonium capillare* f. *stagnale* (Kütz.) Hirn.

(Figs. 139–142, 145, 146, 153 redrawn from Hirn.)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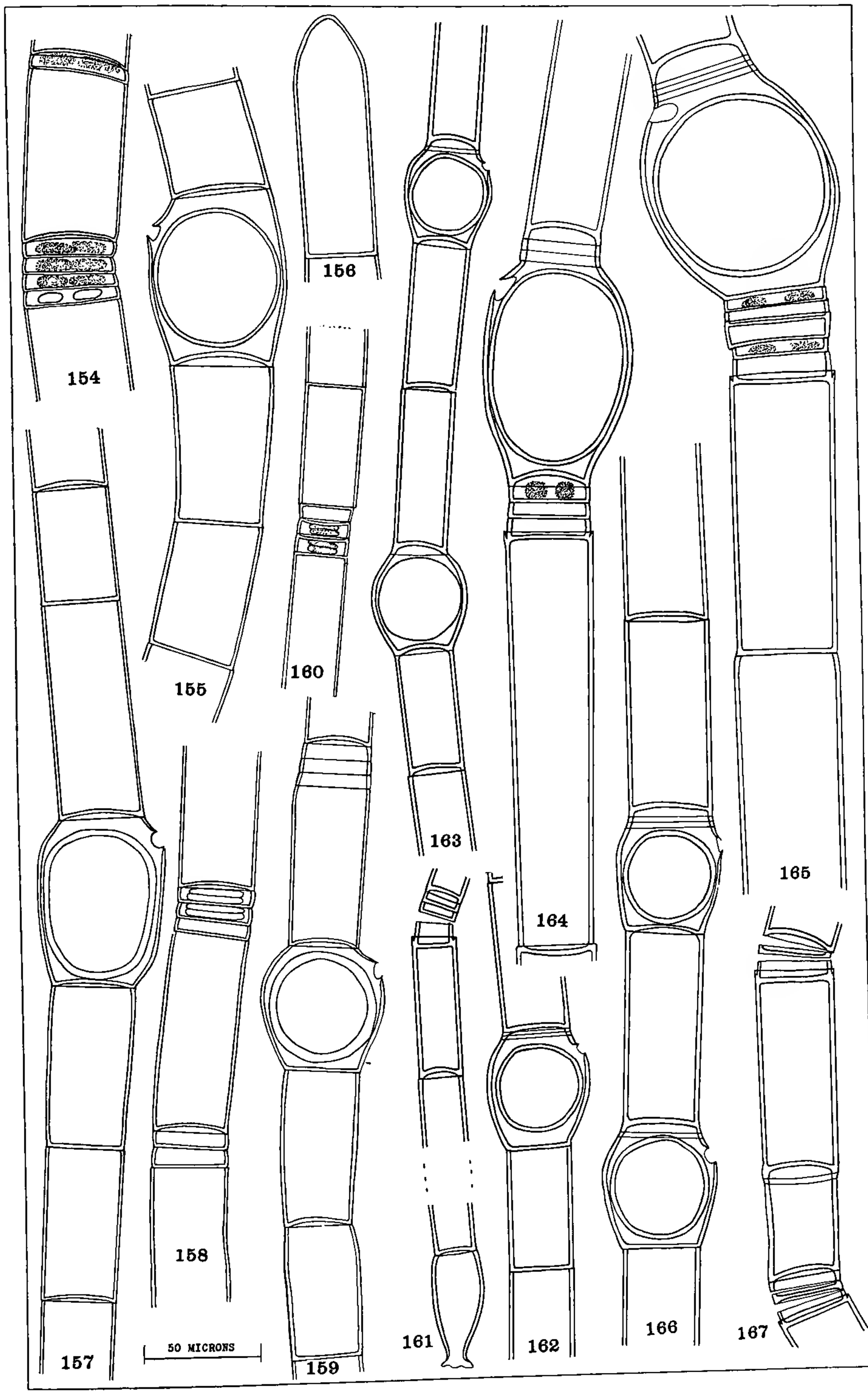
OEDOGONIUM

Plate 12

Figs. 154–156. *Oedogonium anomalum* Hirn.
Figs. 157, 158. *Oedogonium capilliforme* Kütz.
Figs. 159, 160. *Oedogonium capilliforme* f *Debaryanum* (Chmiel.) Hirn.
Figs. 161–163. *Oedogonium capilliforme* var. *australe* Wittr.
Fig. 164. *Oedogonium martinicense* Hirn.
Fig. 165. *Oedogonium Kurzii* G. Zeller.
Figs. 166, 167. *Oedogonium diversum* (Hirn) Tiff.

(Figs. 164–167 redrawn from Hirn.)

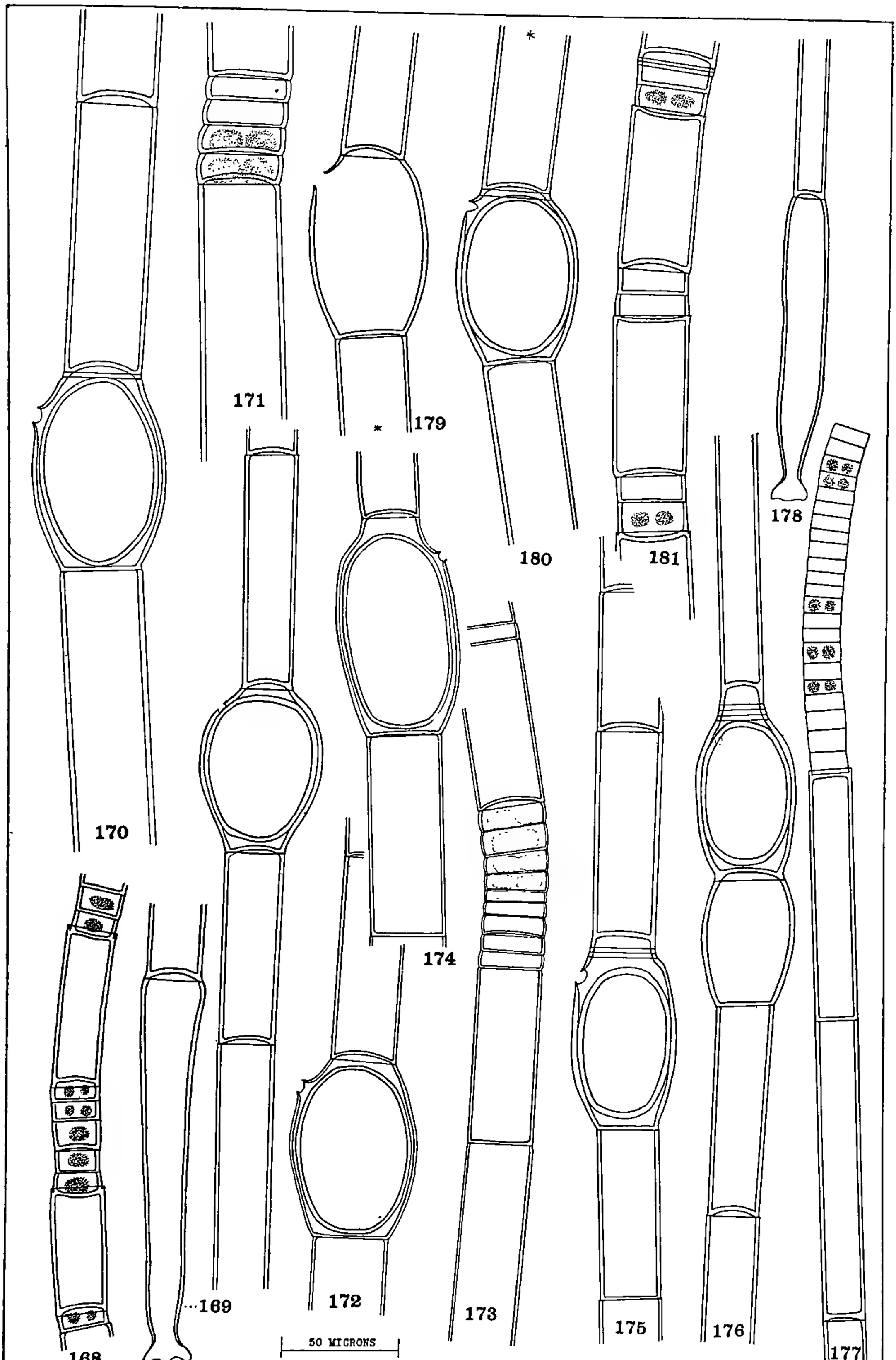


OEDOGONIUM

Plate 13

Figs. 168, 169. *Oedogonium oboviforme* Wittr.
Figs. 170, 171. *Oedogonium majus* (Hansg.) Tiff.
Figs. 172–174. *Oedogonium grande* Kütz.
Fig. 175. *Oedogonium grande* var. *aequatoriale* Wittr.
Figs. 176–178. *Oedogonium angustum* (Hirn) Tiff.
Figs. 179–181. *Oedogonium pachyandrium* Wittr.

(Figs. 168, 169, 175–181 redrawn from Hirn.)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OEDOGONIUM

Plate 14

Figs. 182, 183. *Oedogonium amplum* Magnus & Wille.

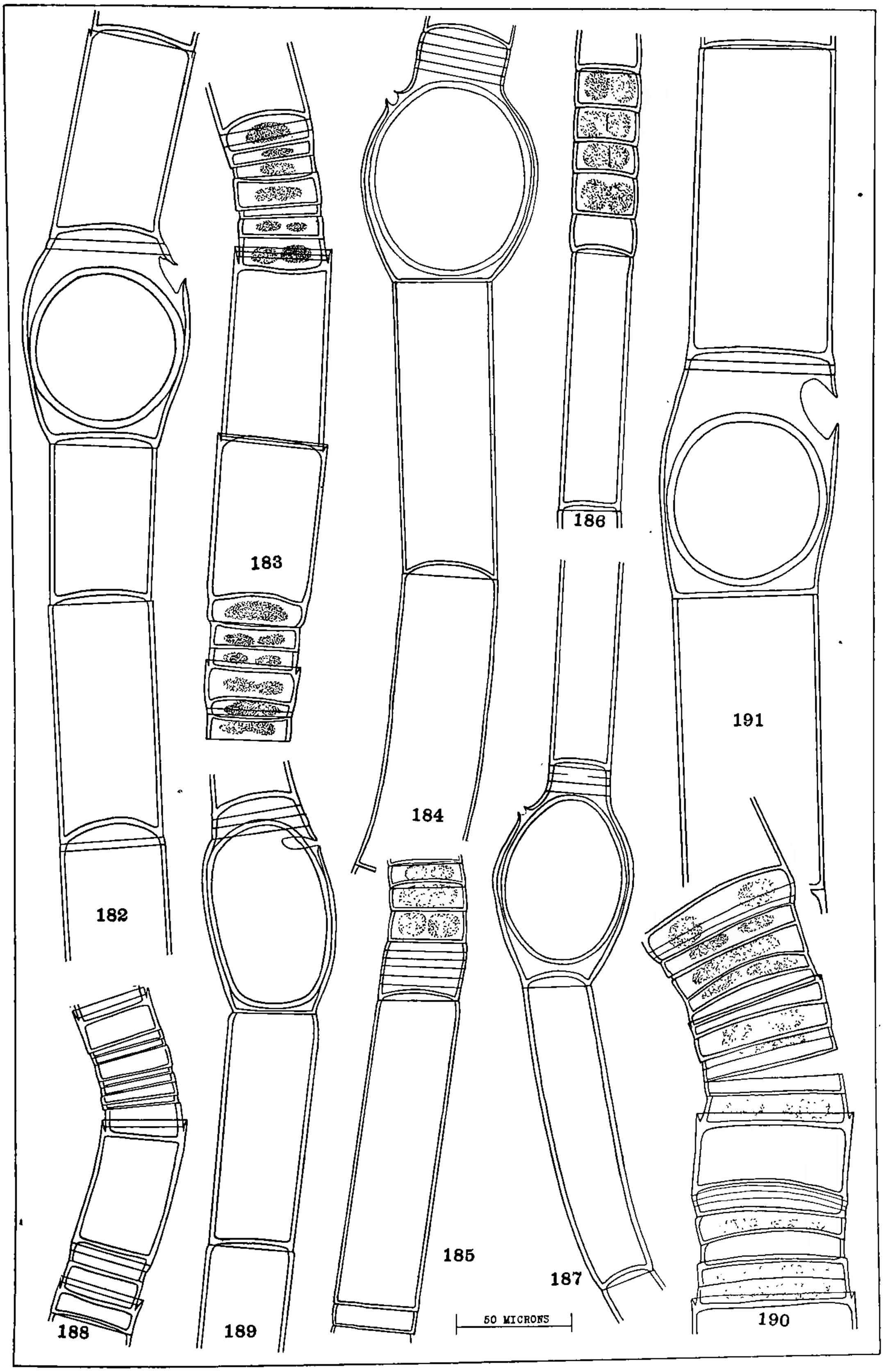
Figs. 184, 185. *Oedogonium crassum* (Hassall) Wittr.

Figs. 186, 187. *Oedogonium Landsboroughi* (Hassall) Wittr.

Figs. 188, 189. *Oedogonium Landsboroughi* var. *norvegicum* Wittr.

Figs. 190, 191. *Oedogonium fabulosum* Hirn.

(Figs. 182, 183, 190, 191 redrawn from Hirn.)

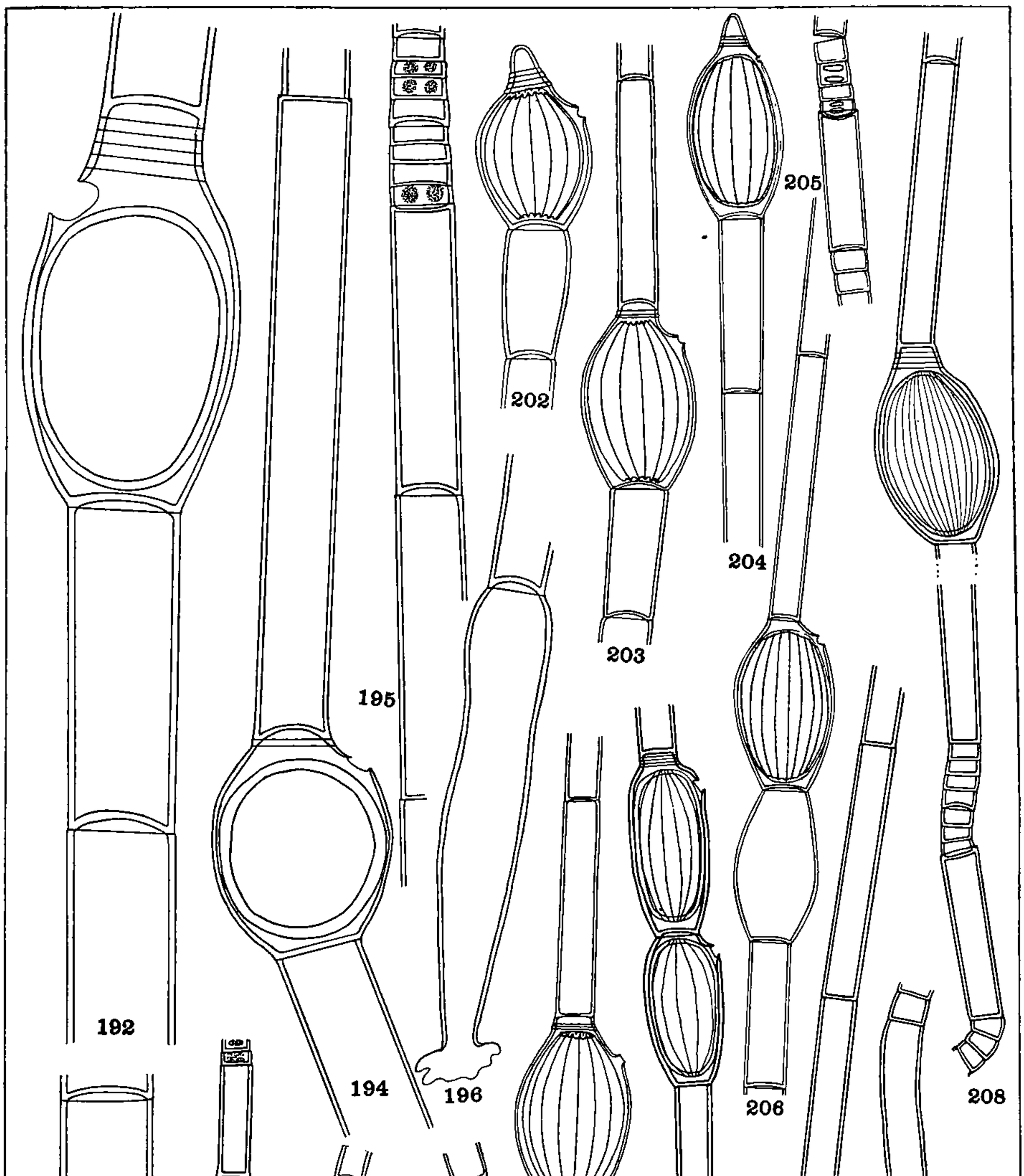


OEDOGONIUM

Plate 15

Figs. 192, 193. *Oedogonium longum* (Transeau) Transeau.
Figs. 194–196. *Oedogonium subrectum* Hirn.
Figs. 197, 198. *Oedogonium paulense* Nordst & Hirn.
Figs. 199–203. *Oedogonium exocostatum* Tiff.
Figs. 204–206. *Oedogonium crenulatocostatum* Wittr.
Fig. 207. *Oedogonium crenulatocostatum* var. *cylindricum* (Hirn) Tiff.
Fig. 208. *Oedogonium paludosum* (Hassall) Wittr.
Fig. 209. *Oedogonium paludosum* var. *parvisporum* Hirn.
Fig. 210. *Oedogonium carolinianum* Tiff.

(Figs. 194–196 redrawn from Hirn; 197 from Schmidle.)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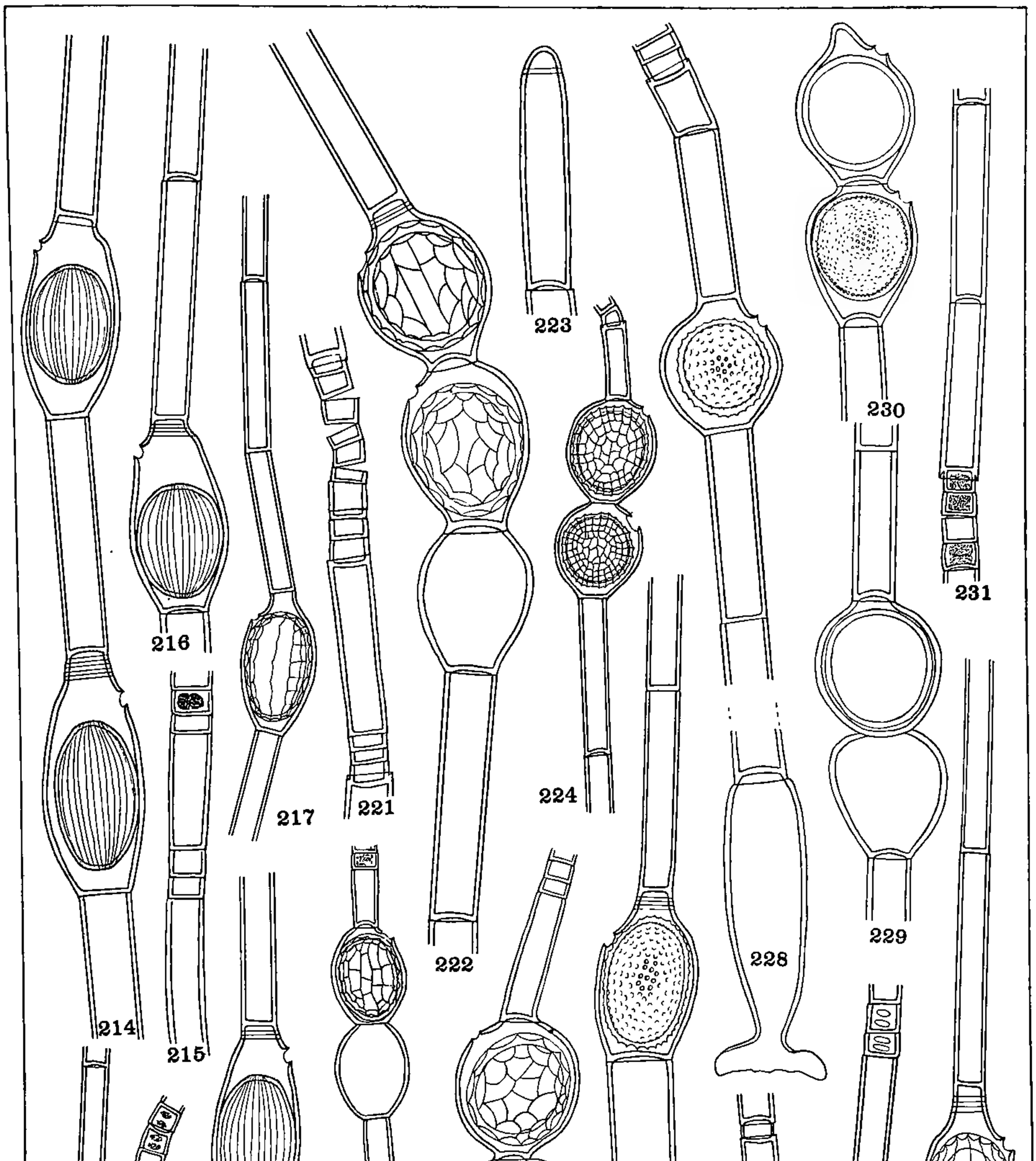
OEDOGONIUM

Plate 16

Figs. 211–213. *Oedogonium occidentale* (Hirn) Tiff.
Figs. 214, 215. *Oedogonium Boscii* (Le Clerc) Wittr.
Fig. 216. *Oedogonium Boscii* f. *dispar* Hirn.
Fig. 217. *Oedogonium aureum* (Tilden) Tiff.
Figs. 218, 219. *Oedogonium subareolatum* Tiff.
Fig. 220. *Oedogonium arcyosporum* Nordst. & Hirn.
Figs. 221–223. *Oedogonium areolatum* Lagerh.
Fig. 224. *Oedogonium dictyosporum* Wittr.
Fig. 225. *Oedogonium scrobiculatum* Wittr.
Figs. 226, 227. *Oedogonium longiarticulatum* (Hansg.) Tiff.
Fig. 228. *Oedogonium foveolatum* Wittr.
Figs. 229–231. *Oedogonium figuratum* Tiff.

(Figs. 211–213, 216, 217, 220–225, 228 redrawn from Hirn.)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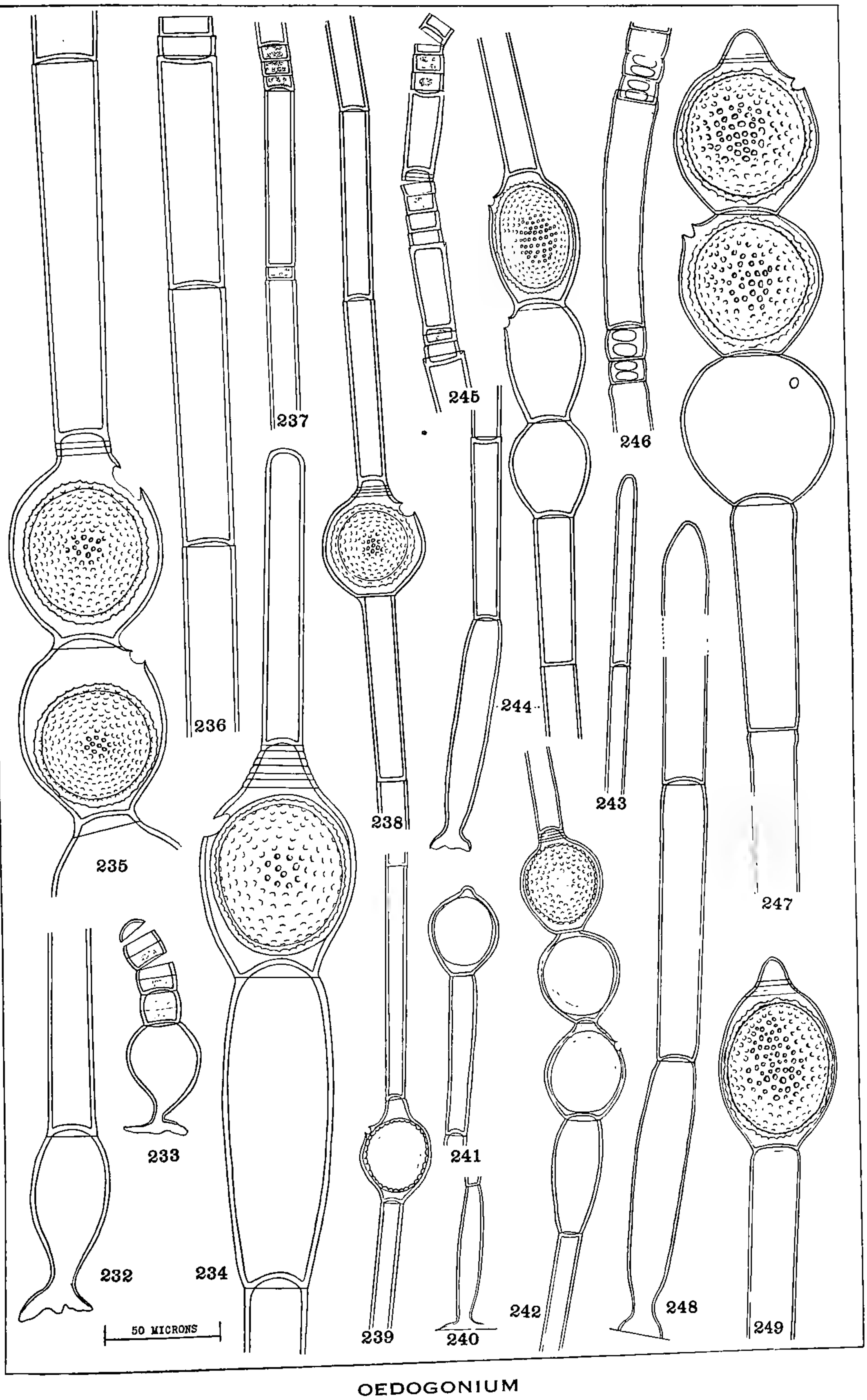
OEDOGONIUM

Plate 17

Figs. 232–234. *Oedogonium verrucosum* Hallas.
Figs. 235, 236. *Oedogonium taphrosporum* Nordst. & Hirn.
Figs. 237, 238. *Oedogonium argenteum* Hirn.
Figs. 239–243. *Oedogonium indianense* Britton & Smith.
Figs. 244, 245. *Oedogonium punctatum* Wittr.
Figs. 246–249. *Oedogonium Wyliei* Tiff.

(Figs. 232–234 redrawn from Hallas; 235, 236, 244, 245 from Hirn.)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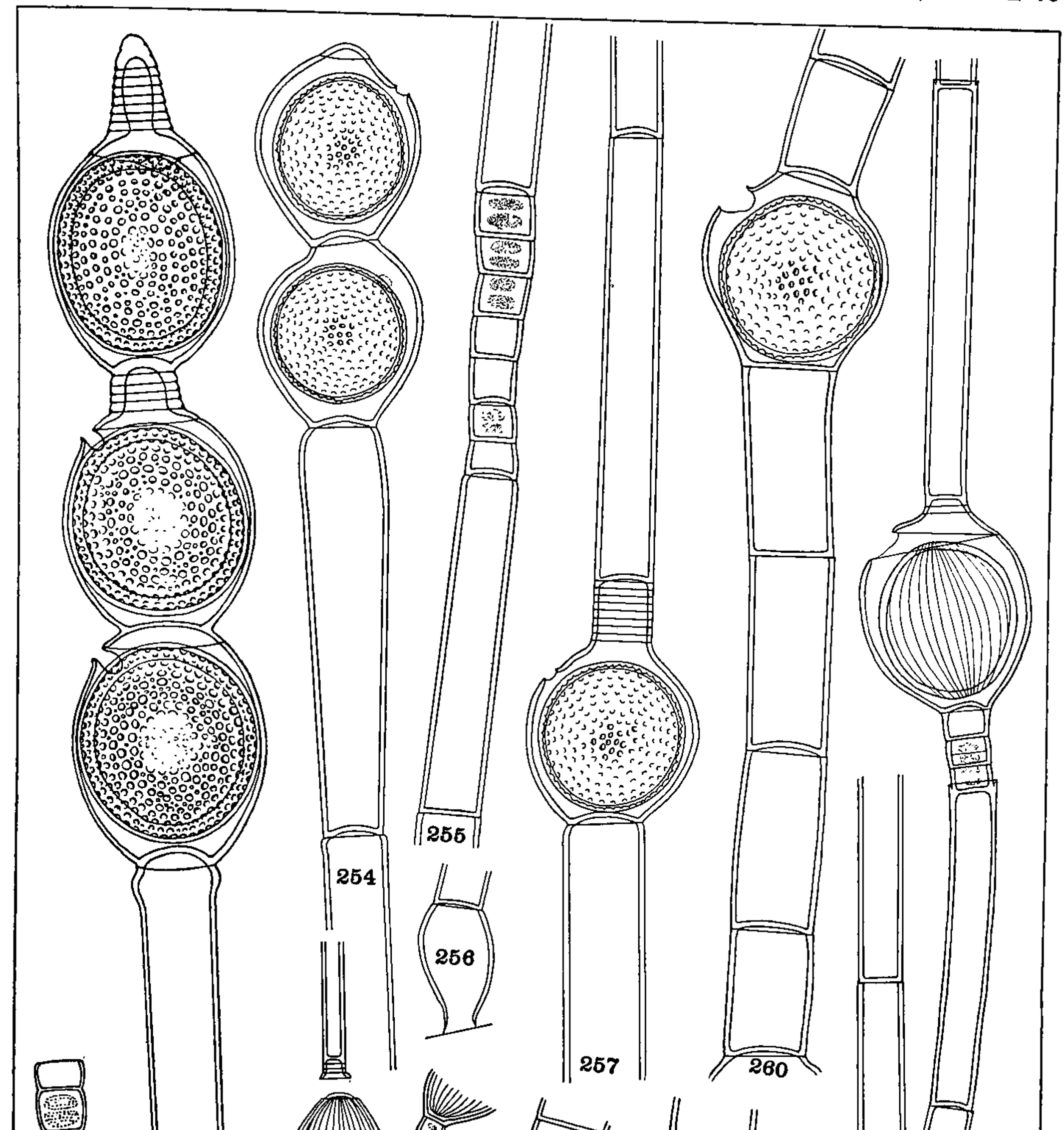
OEDOGONIUM

Plate 18

Figs. 250, 251. *Oedogonium suborbiculare* Jao.
Figs. 252, 253. *Oedogonium pseudacrosporum* Wittr.
Figs. 254–257. *Oedogonium Tiffanyi* Ackley.
Figs. 258–260. *Oedogonium americanum* Transeau.
Fig. 261. *Oedogonium nobile* Wittr.
Fig. 262. *Oedogonium nobile* var. *minus* Hirn.

(Figs. 250, 251 after Jao; 252, 253, 261, 262 redrawn from Hirn.)

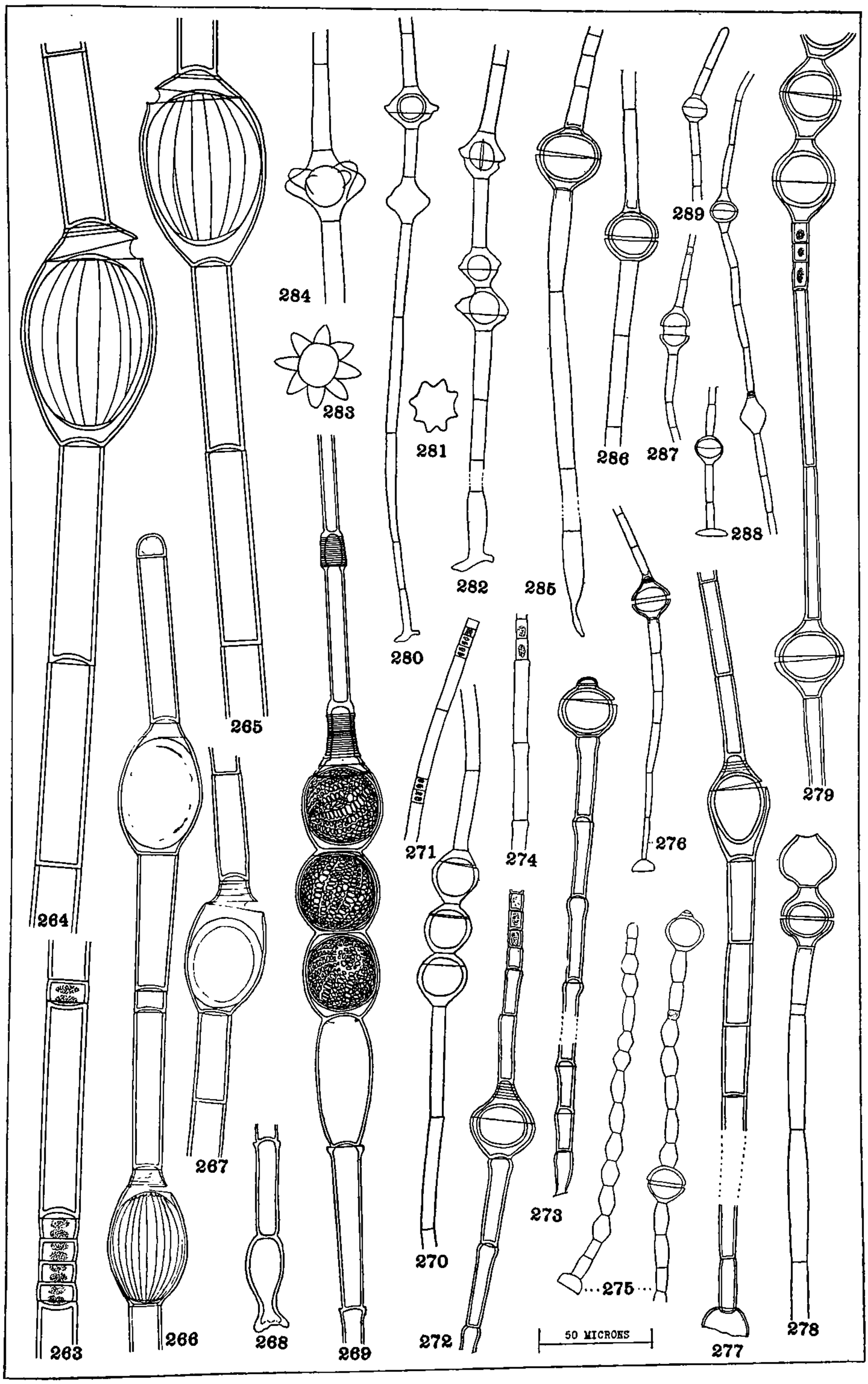


OEDOGONIUM

Plate 19

Figs. 263, 264. *Oedogonium paucocostatum* Transeau.
Fig. 265. *Oedogonium paucostriatum* Tiff.
Figs. 266, 267. *Oedogonium eriense* Tiff.
Figs. 268, 269. *Oedogonium reticulocostatum* Jao.
Figs. 270, 271. *Oedogonium mitratum* Hirn.
Figs. 272–274. *Oedogonium spurium* Hirn.
Fig. 275. *Oedogonium Reinschii* Roy.
Fig. 276. *Oedogonium tapeinosporum* Wittr.
Fig. 277. *Oedogonium sancti-thomae* Wittr. & Cleve.
Fig. 278. *Oedogonium Gunnii* Wittr.
Fig. 279. *Oedogonium psaegmatosporum* Nordst.
Figs. 280–282. *Oedogonium mammiferum* Wittr.
Figs. 283, 284. *Oedogonium Itzigsohnii* De Bary.
Fig. 285. *Oedogonium acmandrium* Elfv.
Fig. 286. *Oedogonium poecilosporum* Nordst. & Hirn.
Fig. 287. *Oedogonium pusillum* Kirchner.
Figs. 288, 289. *Oedogonium inconspicuum* Hirn.

(Figs. 268, 269 after Jao; 279, 283–286 redrawn from Hirn.)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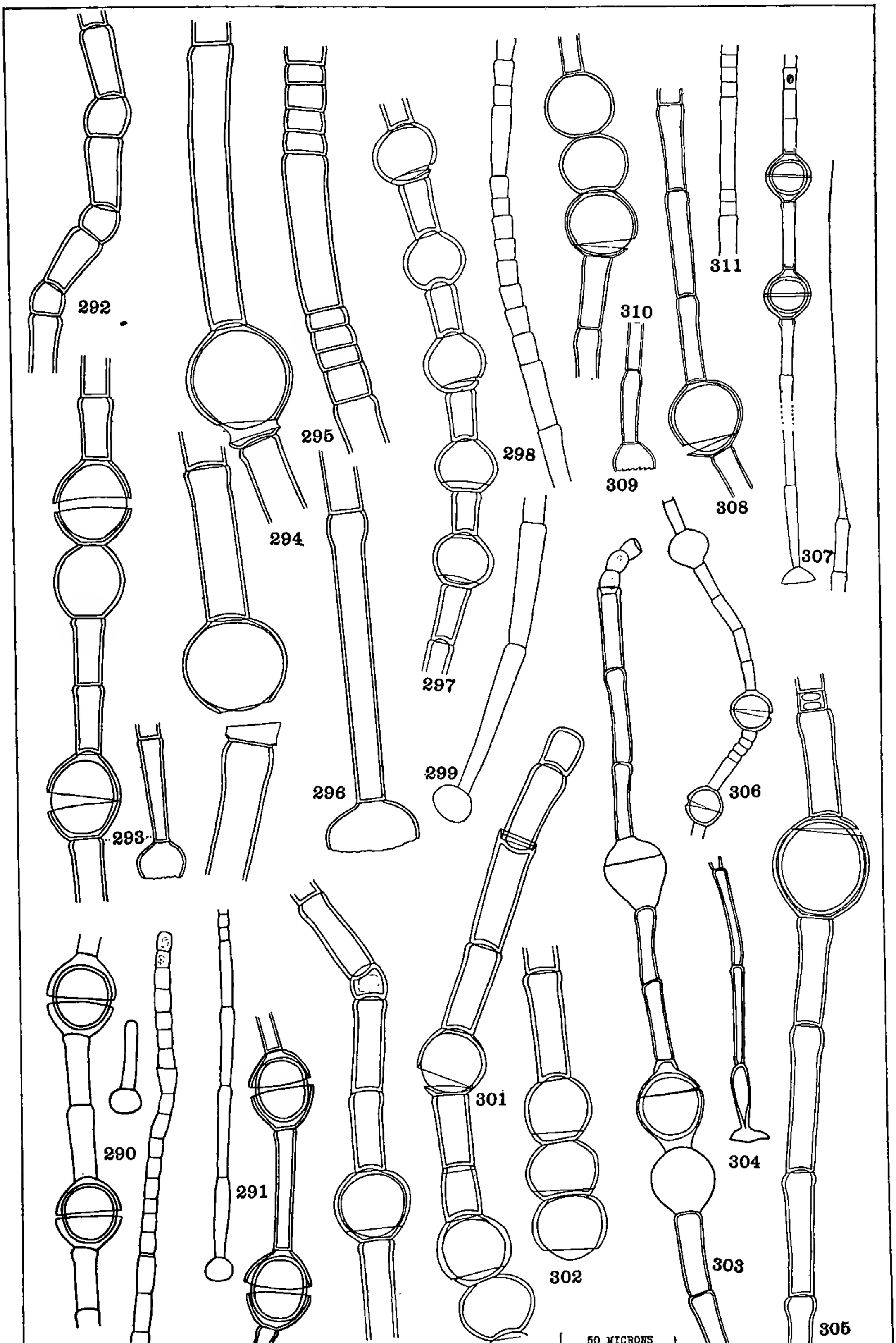
OEDOGONIUM

Plate 20

Figs. 290, 291. *Oedogonium Howardii* G. West.
Figs. 292, 293. *Oedogonium latiusculum* Tiff.
Figs. 294–296. *Oedogonium infimum* Tiff.
Figs. 297–299. *Oedogonium Howei* Tiff.
Figs. 300–302. *Oedogonium Brittonii* Tiff.
Figs. 303, 304. *Oedogonium ouchitanum* Taft.
Fig. 305. *Oedogonium bohemicum* Hirn.
Figs. 306, 307. *Oedogonium capitellatum* Wittr.
Figs. 308–311. *Oedogonium inversum* Wittr.

(Figs. 291 redrawn from West; 303, 304, after Taft; 307 from Hirn.)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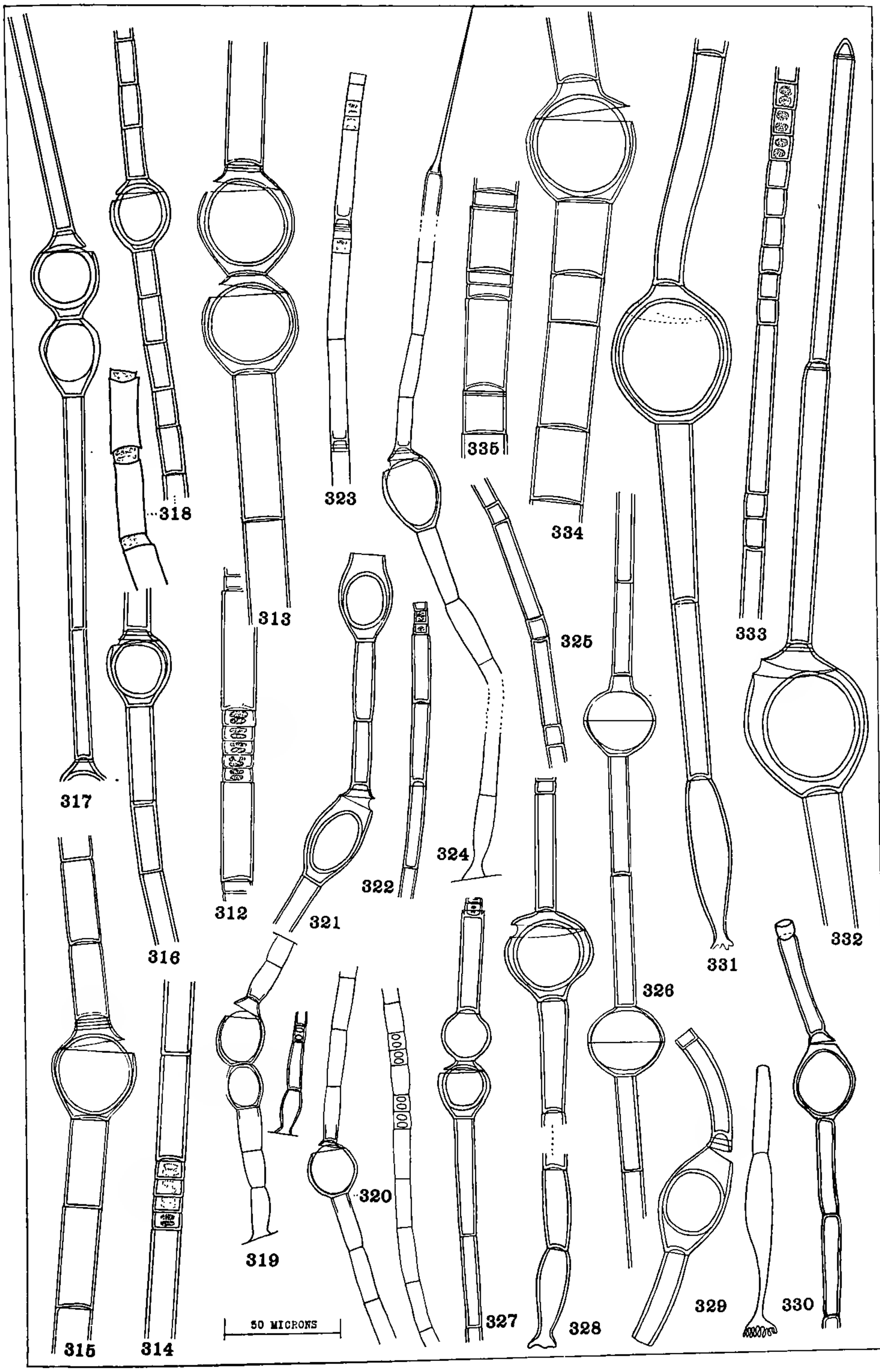
OEDOGONIUM

Plate 21

Figs. 312, 313. *Oedogonium Pringsheimii* Cramer.
Figs. 314–317. *Oedogonium Pringsheimii* var. *Nordstedtii* Wittr.
Fig. 318. *Oedogonium abbreviatum* (Hirn) Tiff.
Figs. 319, 320. *Oedogonium epiphyticum* Transeau & Tiff.
Figs. 321, 322. *Oedogonium porrectum* Nordst. & Hirn.
Figs. 323, 324. *Oedogonium pisanum* Wittr.
Figs. 325, 326. *Oedogonium pratense* Transeau.
Fig. 327. *Oedogonium loricatum* Hirn.
Fig. 328. *Oedogonium amplius* (W. R. Taylor) Tiff.
Figs. 329, 330. *Oedogonium Hallasiae* Tiff.
Figs. 331–333. *Oedogonium iowense* Tiff.
Figs. 334, 335. *Oedogonium Welwitschii* W. & G. West.

(Figs. 321–324, 327 redrawn from Hirn; 330 after Taft.)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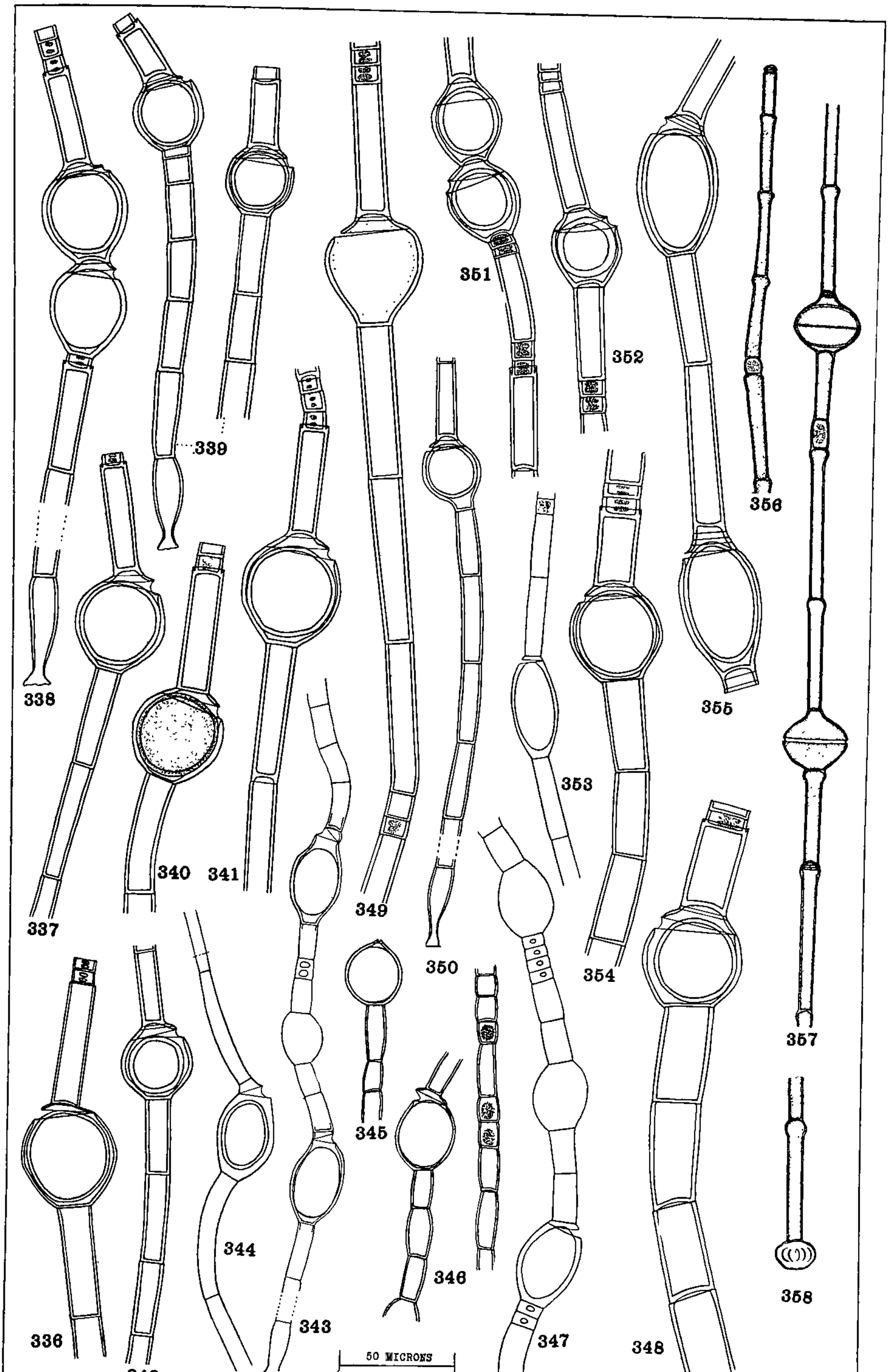
OEDOGONIUM

Plate 22

Figs. 336, 337. *Oedogonium crispum* (Hassall) Wittr.
Fig. 338. *Oedogonium crispum* var. *gracilescens* Wittr.
Fig. 339. *Oedogonium crispum* var. *uruguayense* Magnus & Wille.
Fig. 340. *Oedogonium crispum* var. *granulosum* Nordst.
Fig. 341. *Oedogonium crispum* f. *inflatum* Hirn.
Fig. 342. *Oedogonium crispum* var. *hawaiense* Nordst.
Fig. 343. *Oedogonium oblongum* Wittr.
Fig. 344. *Oedogonium oblongum* var. *majus* Nordst.
Figs. 345, 346. *Oedogonium nanum* Wittr.
Fig. 347. *Oedogonium oblongellum* Kirchner.
Fig. 348. *Oedogonium rupestre* Hirn.
Fig. 349. *Oedogonium pyriforme* Wittr.
Fig. 350. *Oedogonium Pithophorae* Wittr.
Figs. 351, 352. *Oedogonium obesum* (Wittr.) Hirn.
Figs. 353. *Oedogonium gracillimum* Wittr. & Lundell.
Fig. 354. *Oedogonium autumnale* Wittr.
Fig. 355. *Oedogonium Ahlstrandii* Wittr.
Figs. 356–358. *Oedogonium elegans* var. *americanum* Jao.

(Figs. 338, 339, 341, 342, 344, 348–350, 354, 355 redrawn from Hirn; 347 after West; 356–358 after Jao.)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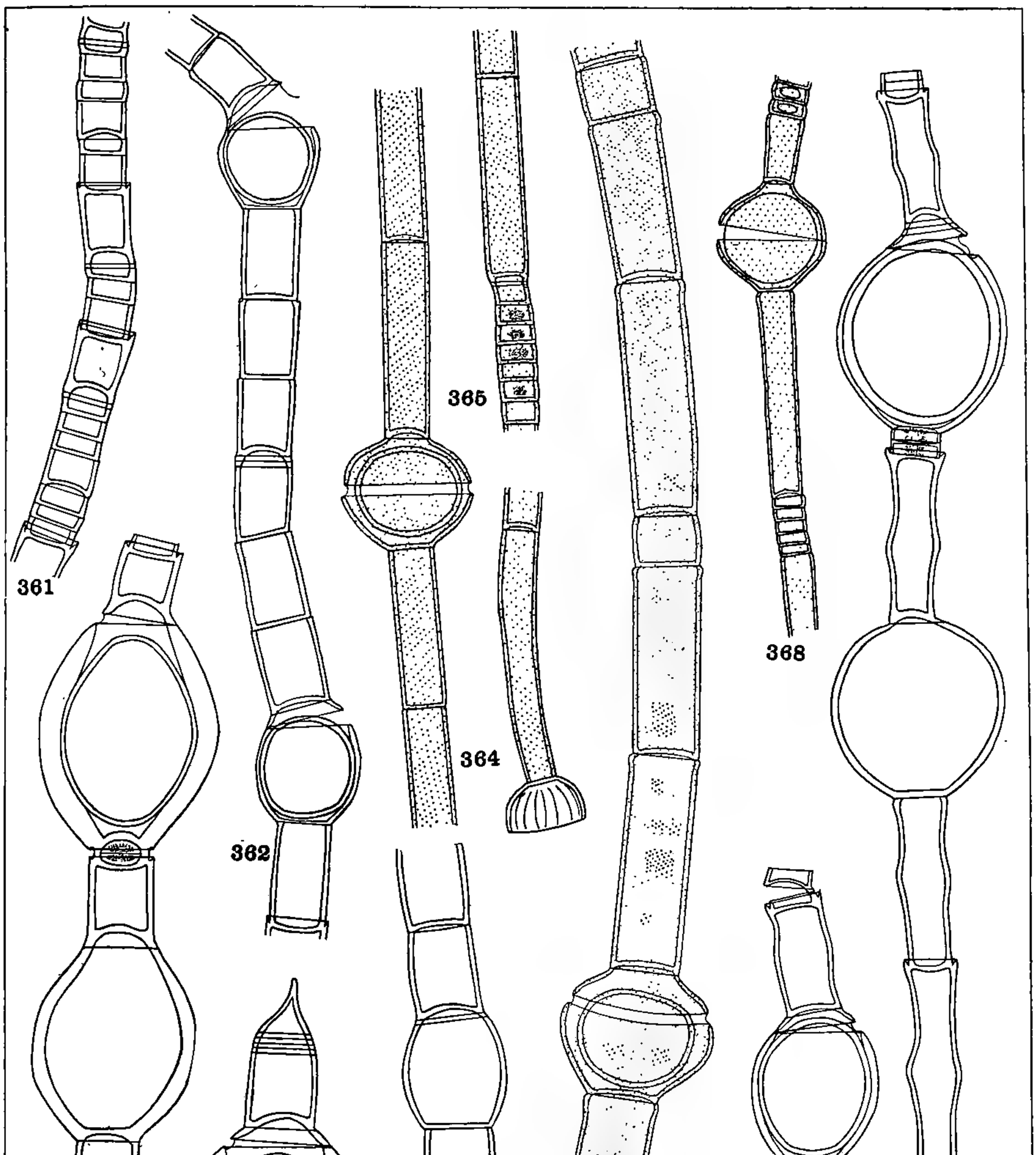
OEDOGONIUM

Plate 23

Figs. 359, 360. *Oedogonium pachydermum* Wittr. & Lundell.
Figs. 361, 362. *Oedogonium pluviale* Nordst.
Fig. 363. *Oedogonium fonticola* A. Br.
Figs. 364, 365. *Oedogonium punctatostriatum* De Bary.
Figs. 366, 367. *Oedogonium spirostriatum* Tiff.
Fig. 368. *Oedogonium minus* Wittr.
Fig. 369. *Oedogonium commune* (Hirn) Tiff.
Figs. 370, 371. *Oedogonium nodulosum* Wittr.

(Figs. 359–365, 369–371 redrawn from Hirn.)

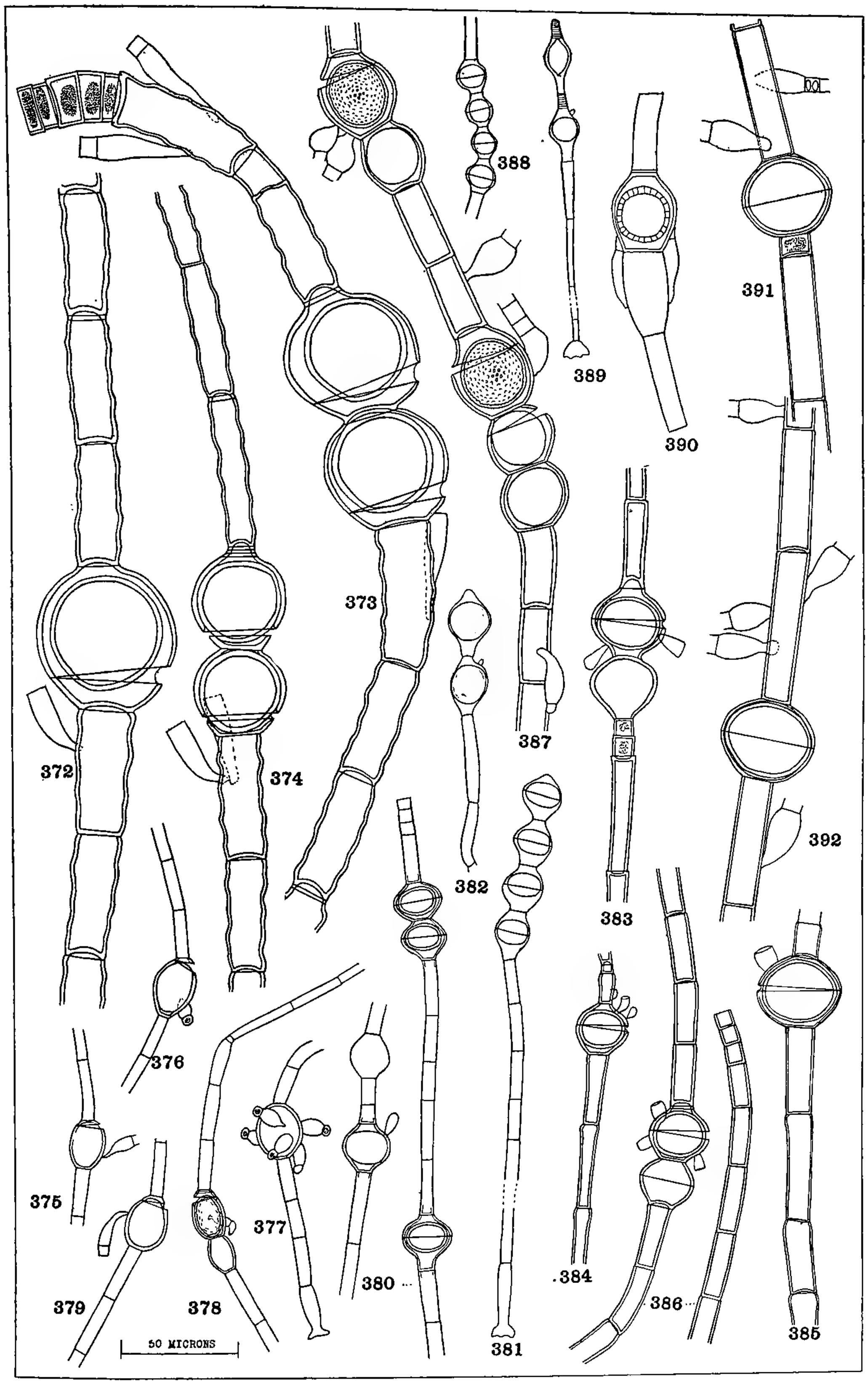


OEDOGONIUM

Plate 24

Fig. 372. *Oedogonium sinuatum* Transeau.
Fig. 373. *Oedogonium undulatum* (Bréb.) A. Br.
Fig. 374. *Oedogonium undulatum* f. *senegalense* (Nordst.) Hirn.
Fig. 375. *Oedogonium rugulosum* Nordst.
Figs. 376, 377. *Oedogonium rugulosum* var. *rotundatum* (Hirn) Tiff.
Fig. 378. *Oedogonium rugulosum* var. *minutum* (Hansg.) Tiff.
Fig. 379. *Oedogonium longatum* Kütz.
Fig. 380. *Oedogonium Rothii* (Le Clerc) Pringsh.
Figs. 381, 382. *Oedogonium senegalense* (Nordst.) Tiff.
Fig. 383. *Oedogonium decipiens* Wittr.
Figs. 384, 385. *Oedogonium decipiens* var. *dissimile* (Hirn) Tiff.
Fig. 386. *Oedogonium decipiens* var. *africanum* Tiff.
Fig. 387. *Oedogonium Ackleyae* Tiff.
Figs. 388, 389. *Oedogonium longicolle* Nordst.
Fig. 390. *Oedogonium Schmidlei* Gutw.
Figs. 391, 392. *Oedogonium macrospermum* W. & G. West.

(Figs. 373, 386 redrawn from Hirn; 380 from Pringsheim; 383 from Wittrock; 388, 389 from Nordstedt; 390 from Gutwinski.)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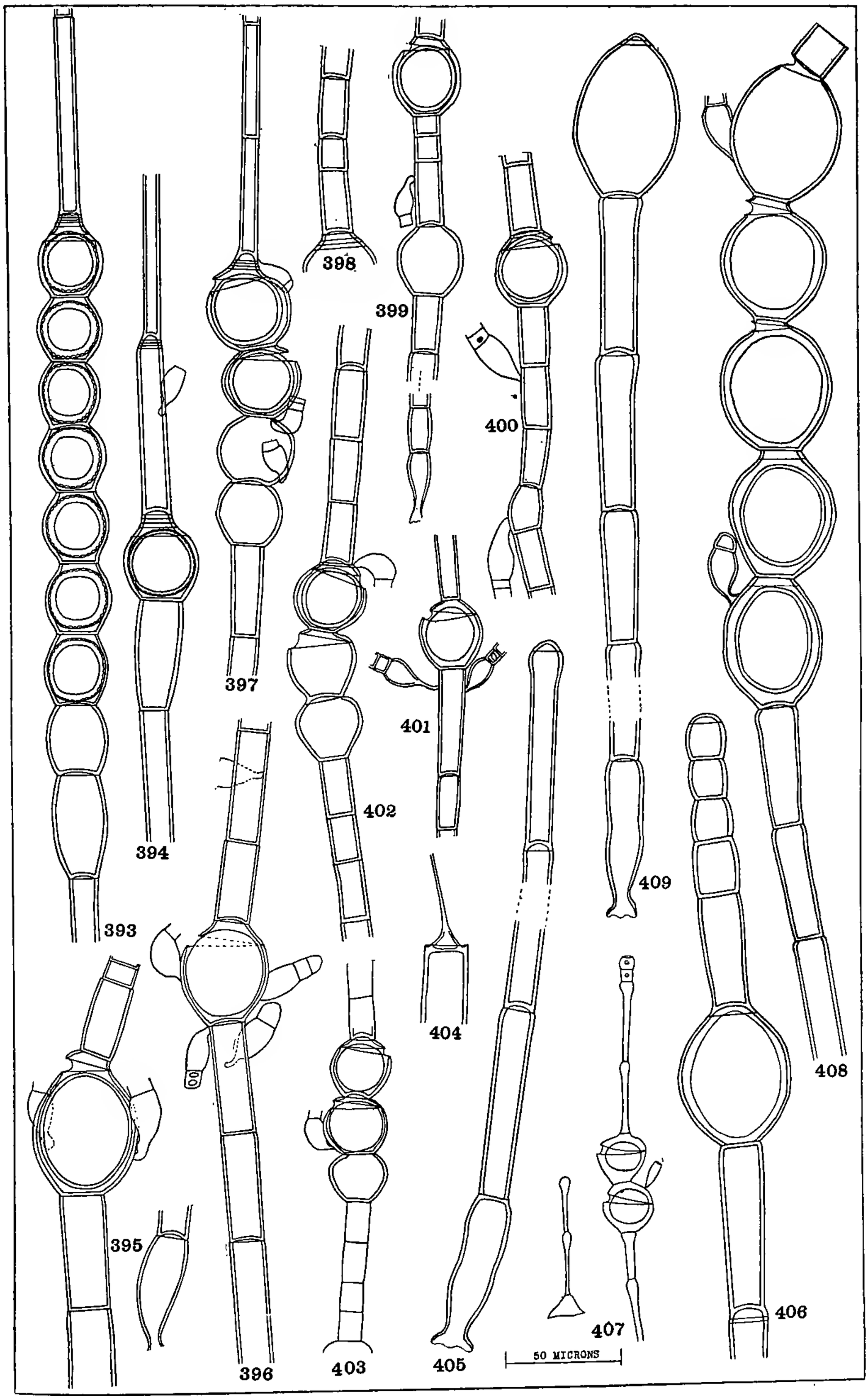
OEDOGONIUM

Plate 25

Figs. 393, 394. *Oedogonium monile* Berk. & Harv.
Fig. 395. *Oedogonium ciliatum* (Hassall) Pringsh.
Fig. 396. *Oedogonium macrandrium* Wittr.
Fig. 397. *Oedogonium macrandrium* var. *aemulans* Hirn.
Figs. 398–400. *Oedogonium macrandrium* var. *Hohenackerii* (Wittr.) Tiff.
Fig. 401. *Oedogonium macrandrium* var. *propinquum* (Wittr.) Hirn.
Fig. 402. *Oedogonium macrandrium* f. *lundense* (Wittr.) Hirn.
Fig. 403. *Oedogonium laetevirens* Wittr.
Figs. 404–406. *Oedogonium completum* (Hirn) Tiff.
Fig. 407. *Oedogonium clavatum* Hallas.
Fig. 408. *Oedogonium obtruncatum* Wittr.
Fig. 409. *Oedogonium obtruncatum* var. *ellipsoideum* Wittr.

(Figs. 393, 394, 397, 402, 404, 405. 409 redrawn from Hirn.)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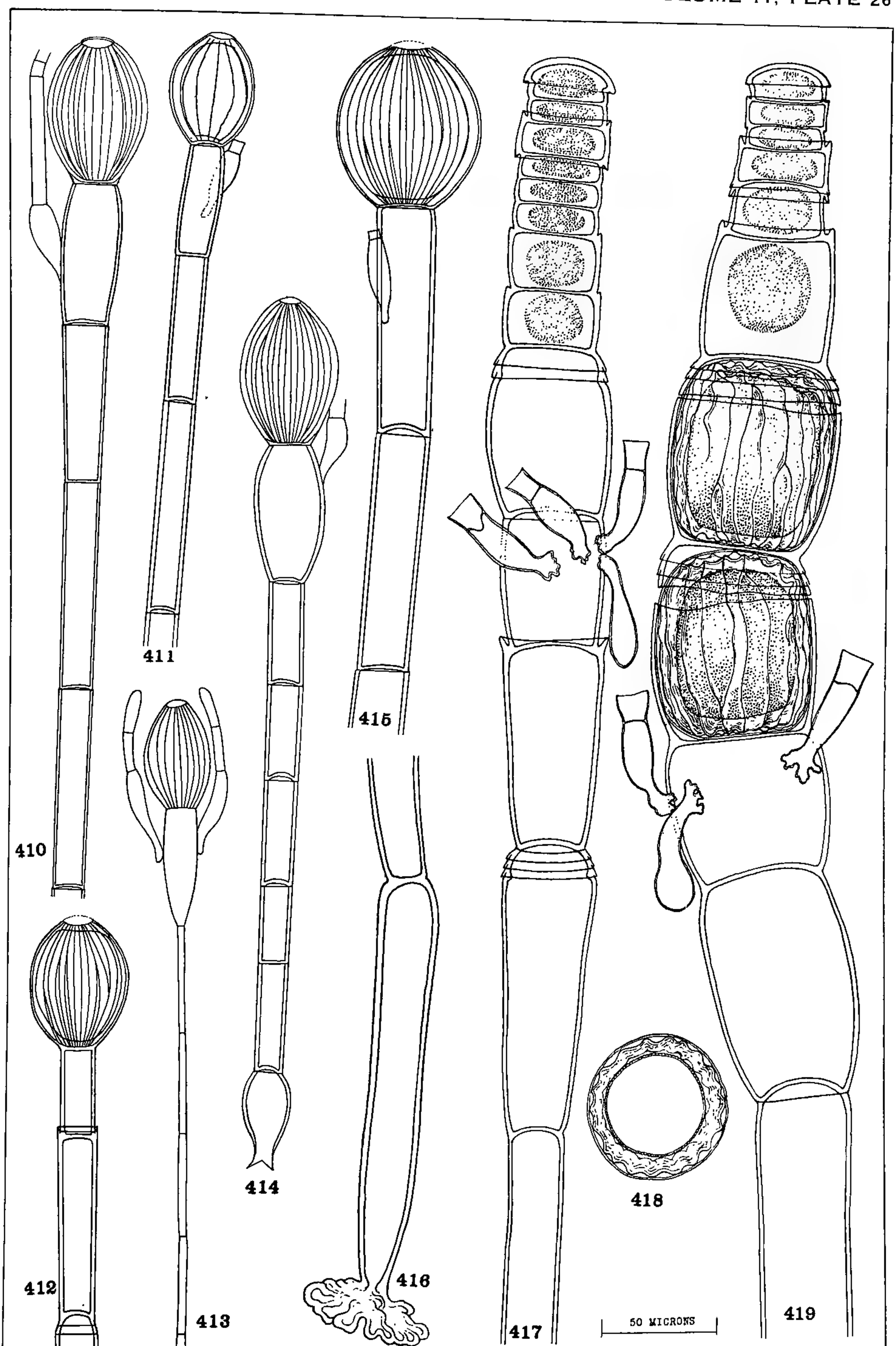
OEDOGONIUM

Plate 26

Fig. 410. *Oedogonium acrosporum* De Bary.
Fig. 411. *Oedogonium acrosporum* var. *bathmidosporum* (Nordst.) Hirn.
Fig. 412. *Oedogonium acrosporum* var. *majusculum* Nordst.
Fig. 413. *Oedogonium acrosporum* var. *floridense* Wolle.
Fig. 414. *Oedogonium acrosporum* var. *boreale* Wolle.
Fig. 415. *Oedogonium tentoriale* Nordst. & Hirn.
Figs. 416–419. *Oedogonium Croasdaleae* Jao. (Fig. 418, section through oospore.)

(Figs. 411, 412 redrawn from Hirn; 413 from Wolle; 416–419 after Jao.)

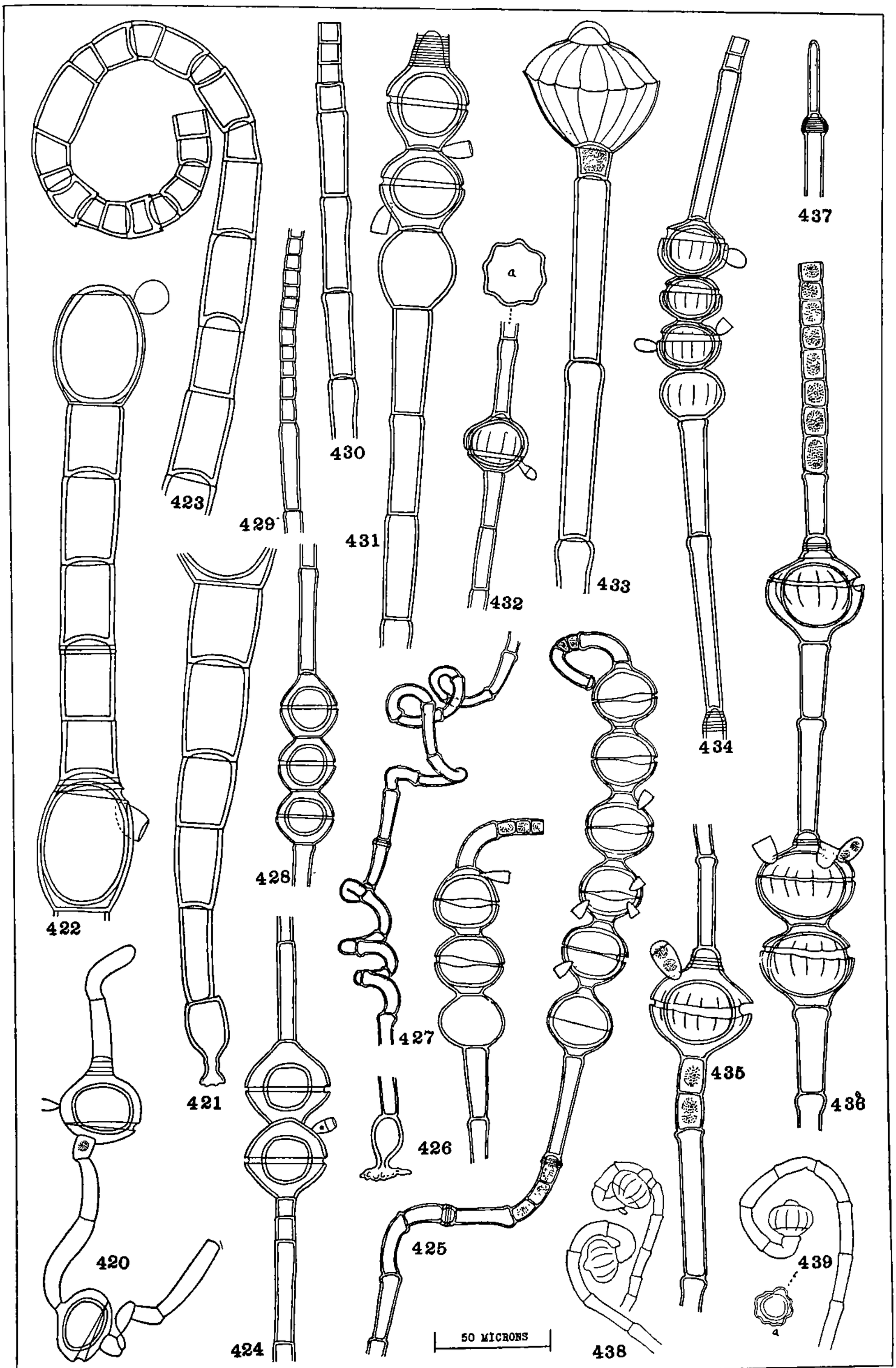


OEDOGONIUM

Plate 27

Fig. 420. *Oedogonium contortum* Hallas.
Figs. 421–423. *Oedogonium spectabile* Hirn.
Fig. 424. *Oedogonium Areschougii* Wittr.
Figs. 425–427. *Oedogonium Areschougii* var. *contortifilum* Jao.
Figs. 428, 429. *Oedogonium subplenum* Tiff.
Figs. 430, 431. *Oedogonium pseudoplenum* Tiff.
Figs. 432. *Oedogonium platygynum* Wittr. (*a*, section through oogonium.)
Fig. 433. *Oedogonium costatum* Transeau.
Fig. 434. *Oedogonium oelandicum* Wittr.
Figs. 435–437. *Oedogonium oelandicum* var. *novae-angliae* Jao.
Figs. 438, 439. *Oedogonium circinatum* Tiff. (*a*, median section through oogonium and oospore.)

(Figs. 420 redrawn from Hallas; 421–423, 430, 431 from Hirn; 424 from Wittrock; 425–427, 435–437 after Jao.)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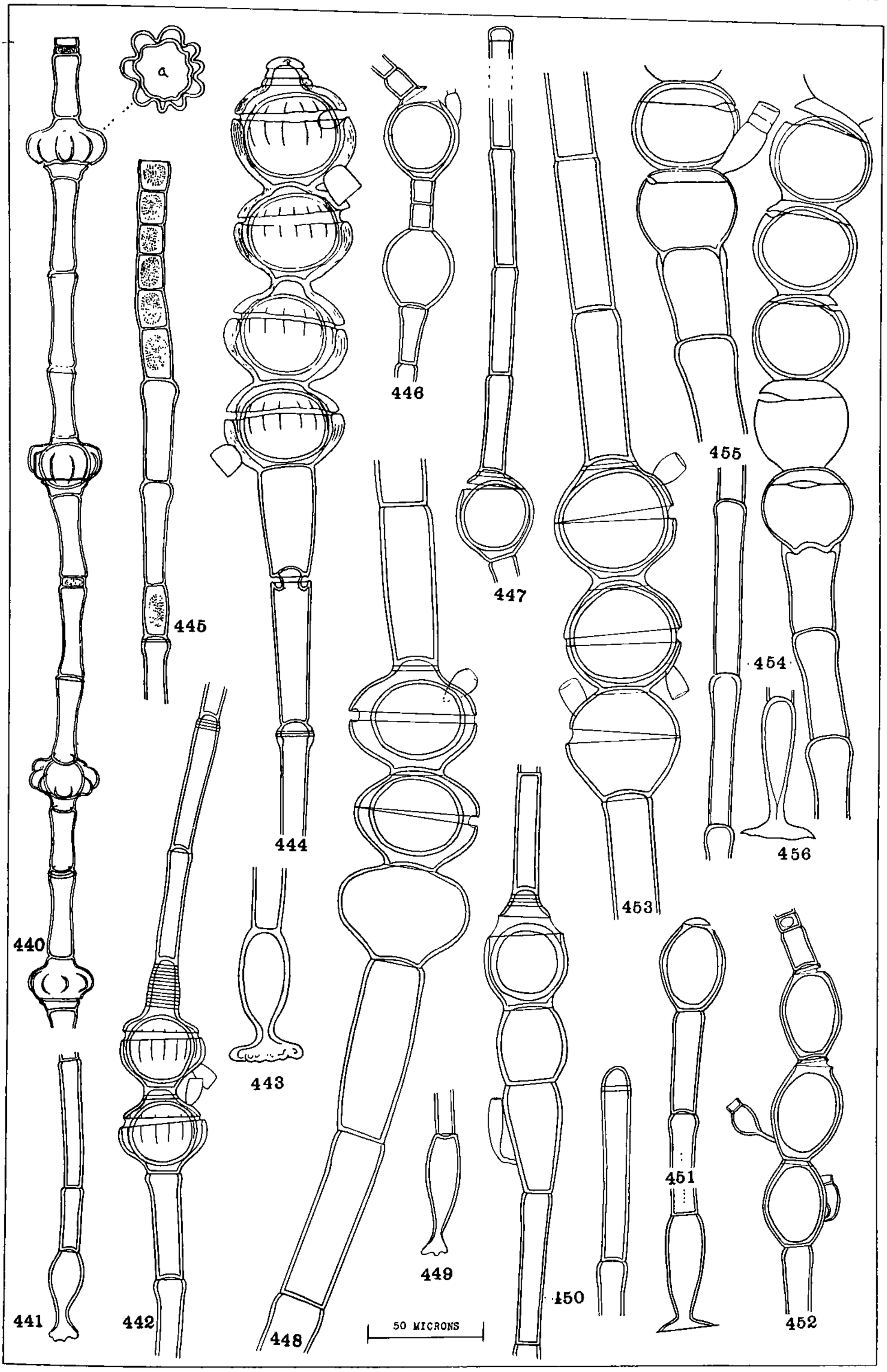
OEDOGONIUM

Plate 28

Fig. 440. *Oedogonium ambiceps* (Jao) Tiff. (*a*, median section through oospore and oogonium.)
Figs. 441, 442. *Oedogonium megaporum* Wittr.
Figs. 443–445. *Oedogonium Jaoii* Tiff.
Figs. 446, 447. *Oedogonium rigidum* Hirn.
Fig. 448. *Oedogonium confertum* Hirn.
Figs. 449, 450. *Oedogonium hians* Nordst. & Hirn.
Figs. 451, 452. *Oedogonium wabashense* Tiff.
Fig. 453. *Oedogonium brasiliense* Borge.
Figs. 454–456. *Oedogonium Taftii* Tiff.

(Figs. 440, 443–445 after Jao; 454–456 after Taft; 446–450, 453 redrawn from Hirn.)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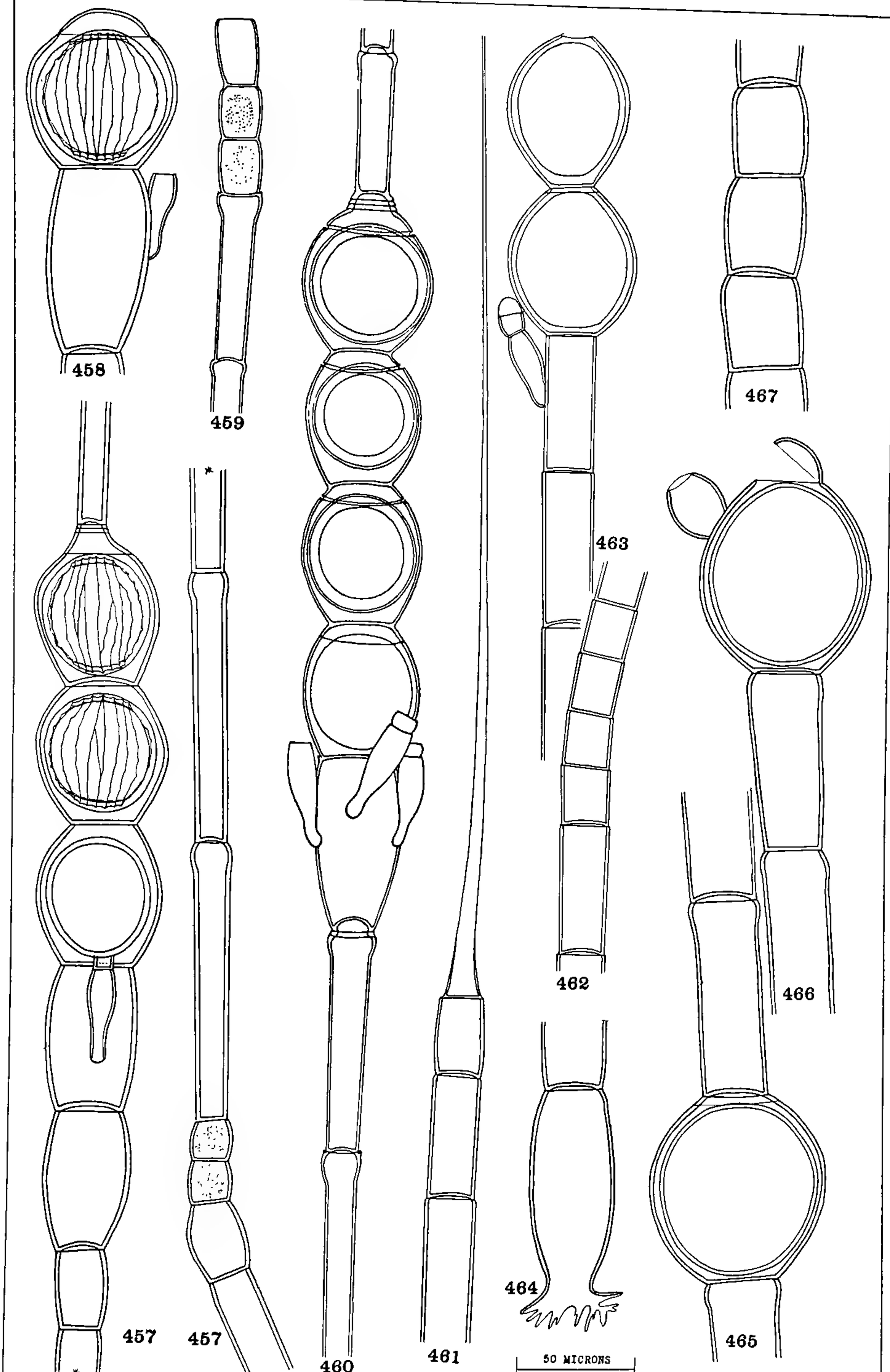
OEDOGONIUM

Plate 29

Figs. 457, 458. *Oedogonium michiganense* Tiff.
Figs. 459, 460. *Oedogonium Collinsii* Tiff.
Figs. 461–463. *Oedogonium praticolum* Transeau.
Figs. 464–467. *Oedogonium supremum* Tiff.

(Figs. 459, 460 after Jao.)

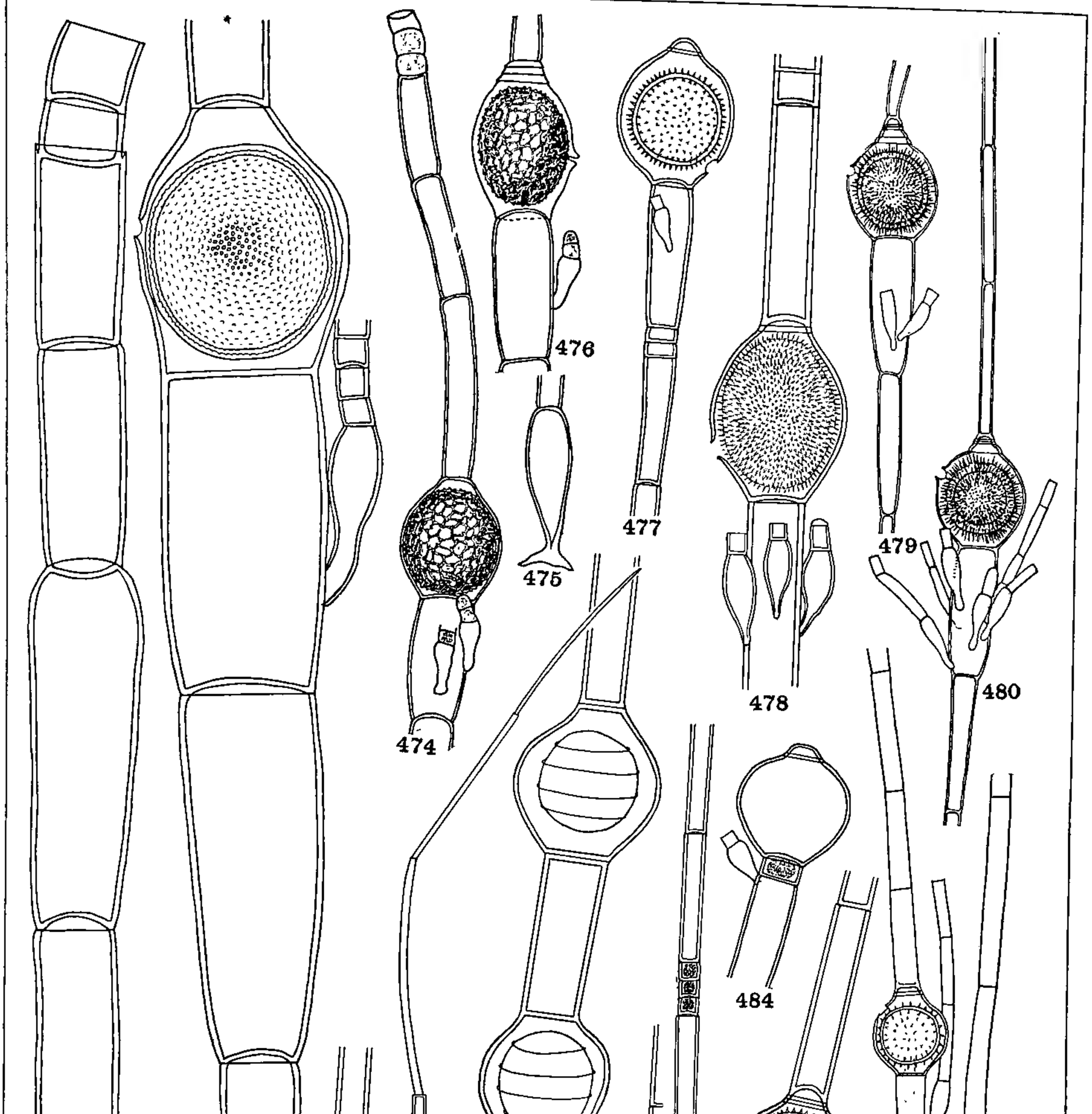


OEDOGONIUM

Plate 30

Figs. 468–470. *Oedogonium nebraskense* Ohashi.
Figs. 471–473. *Oedogonium Huntii* H. C. Wood.
Figs. 474–476. *Oedogonium fuscum* Taft.
Fig. 477. *Oedogonium hispidum* Nordst.
Fig. 478. *Oedogonium canadense* (Tiff.) Tiff.
Figs. 479, 480. *Oedogonium excentriporum* (Jao) Tiff.
Figs. 481, 482. *Oedogonium hystricinum* Transeau & Tiff.
Figs. 483, 484. *Oedogonium pungens* Hirn.
Fig. 485. *Oedogonium armigerum* Hirn.
Fig. 486. *Oedogonium Aster* Wittr.

(Figs. 477, 483–486 redrawn from Hirn; 471–473 from Wood; 474–476 after Taft; 479, 480 after Jao.)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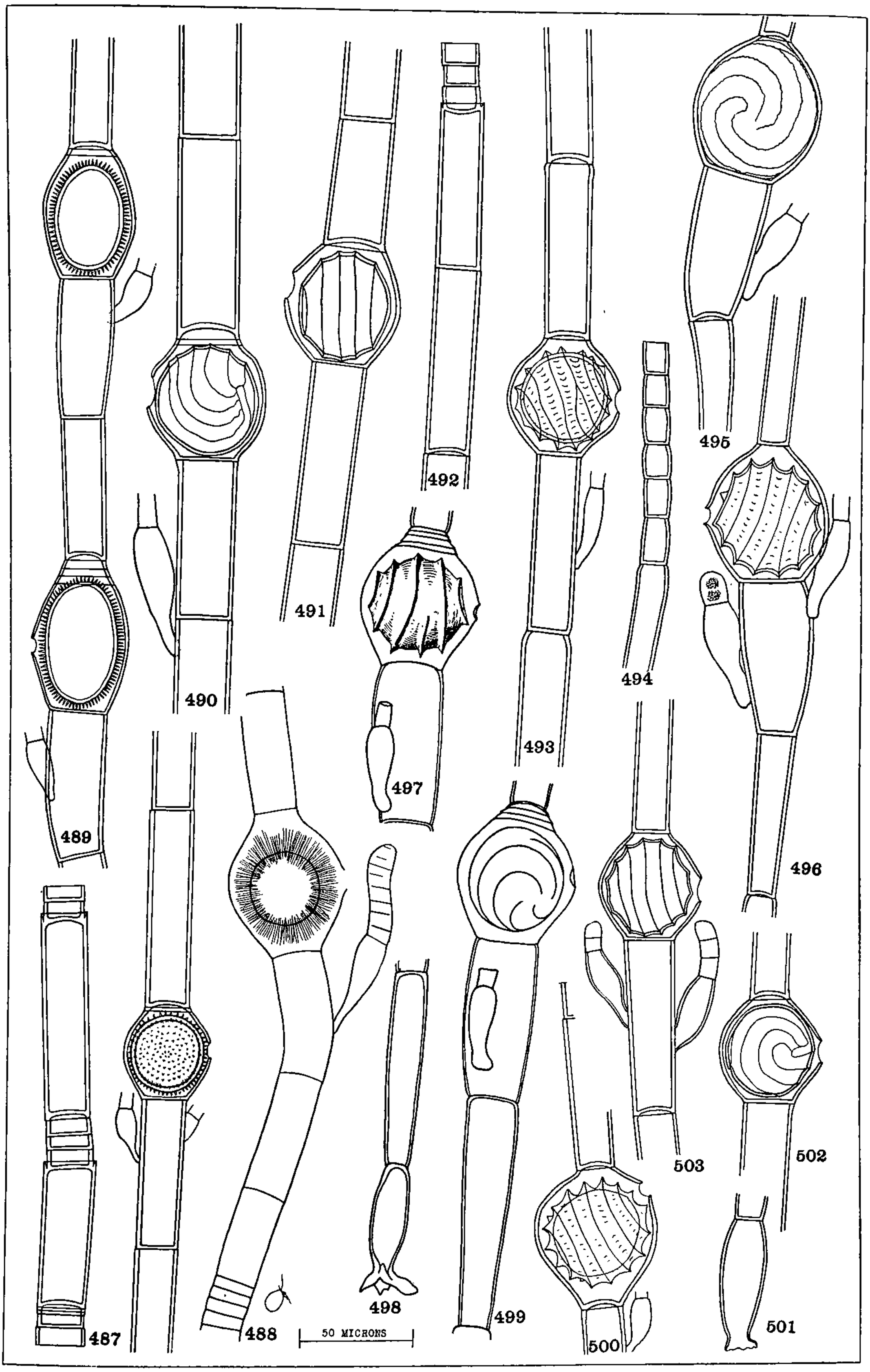
OEDOGONIUM

Plate 31

Fig. 487. *Oedogonium echinospermum* A. Br.
Fig. 488. *Oedogonium echinospermum* var. *horridum* Hirn.
Fig. 489. *Oedogonium hystrix* Wittr.
Figs. 490–492. *Oedogonium spirale* Hirn.
Fig. 493. *Oedogonium acutum* (W. & G. West) Tiff.
Figs. 494–496. *Oedogonium illinoiense* Transeau.
Figs. 497–499. *Oedogonium illinoiense* var. *oklahomense* Taft.
Fig. 500. *Oedogonium latviense* (Tiff.) Tiff.
Figs. 501–503. *Oedogonium exospirale* Tiff.

(Figs. 488 after Wolle; 489 from Wittrock; 490–492 from Hirn; 497–499 after Taft.)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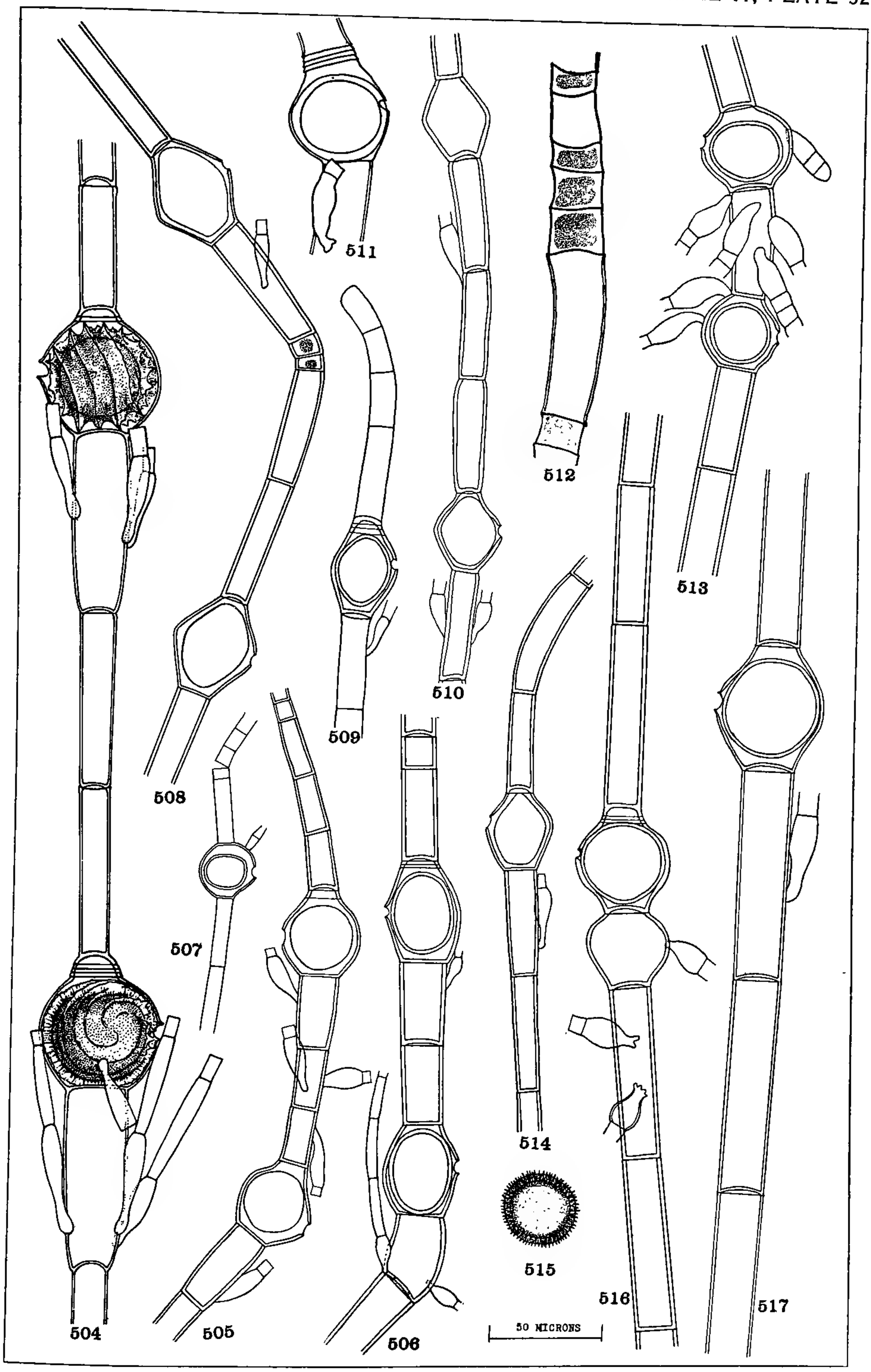
OEDOGONIUM

Plate 32

Fig. 504. *Oedogonium spiripennatum* Jao.
Fig. 505. *Oedogonium Braunii* Kütz.
Fig. 506. *Oedogonium Zehneri* (Tiff.) Tiff.
Fig. 507. *Oedogonium depressum* Pringsh.
Fig. 508. *Oedogonium subsexangulare* Tiff.
Figs. 509–510. *Oedogonium angulosum* Hallas.
Figs. 511, 512. *Oedogonium gallicum* Hirn.
Fig. 513. *Oedogonium magnum* (Ackley) Tiff.
Fig. 514. *Oedogonium sexangulare* Cleve.
Fig. 515. *Oedogonium echinatum* (H. C. Wood) Wittr.
Fig. 516. *Oedogonium gallicum* Hirn.
Fig. 517. *Oedogonium flavescens* (Hassall) Wittr.

(Figs. 504 after Jao; 507, 508, 511, 512 redrawn from Hirn; 509 from Hallas; 515 from Wood; 516 after Taft.)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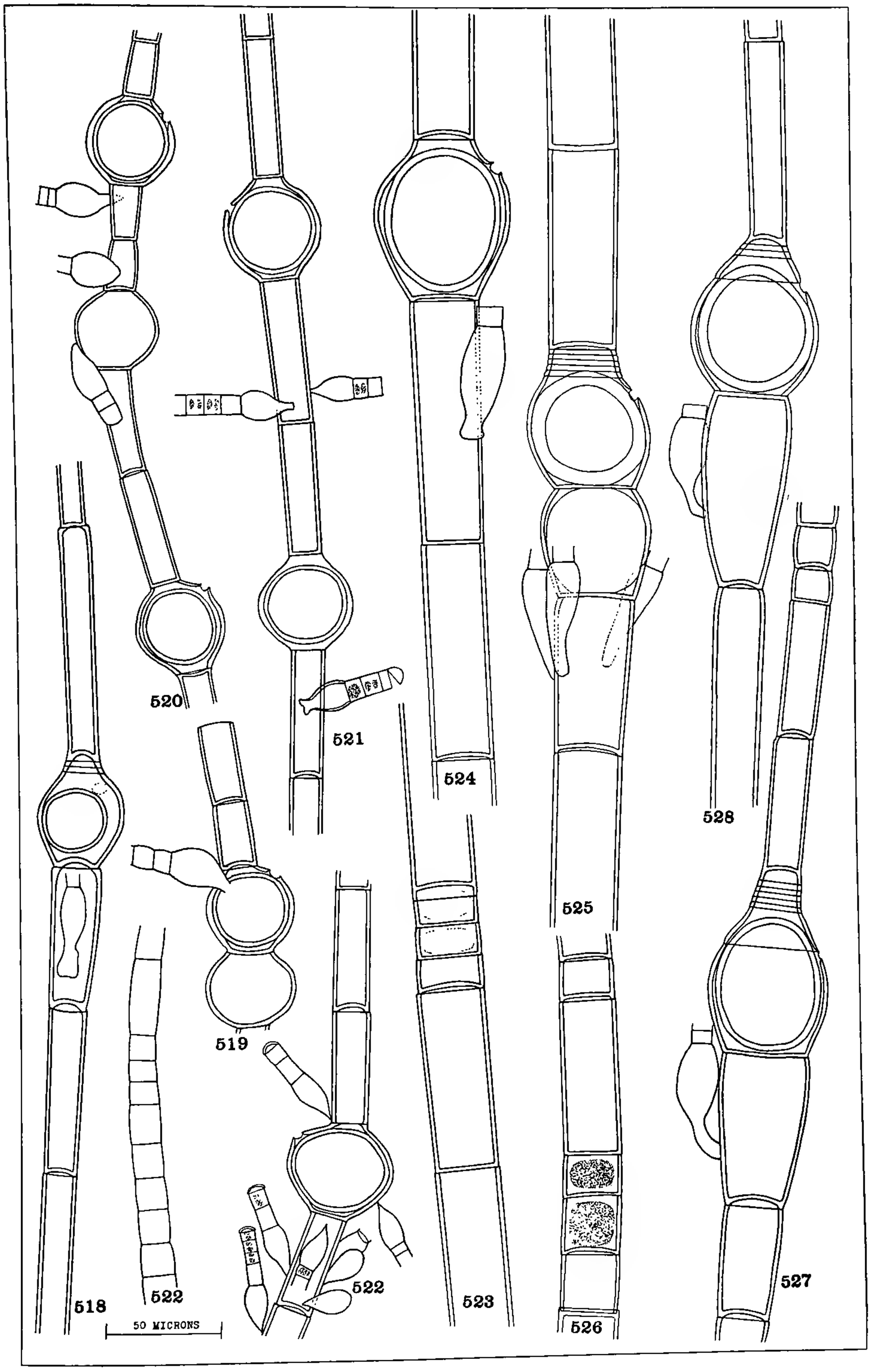
OEDOGONIUM

Plate 33

Fig. 518. *Oedogonium silvaticum* Hallas.
Figs. 519, 520. *Oedogonium multisporum* H. C. Wood.
Fig. 521. *Oedogonium irregulare* Wittr.
Fig. 522. *Oedogonium irregulare* var. *condensatum* (Hallas) Hirn.
Figs. 523, 524. *Oedogonium idioandrosporum* (Nordst. & Wittr.) Tiff.
Figs. 525, 526. *Oedogonium idioandrosporum* var. *minus* Tiff.
Fig. 527. *Oedogonium Borisianum* (Le Clerc) Wittr.
Fig. 528. *Oedogonium Westii* Tiff. & Br.

(Figs. 518, 522 redrawn from Hallas.)

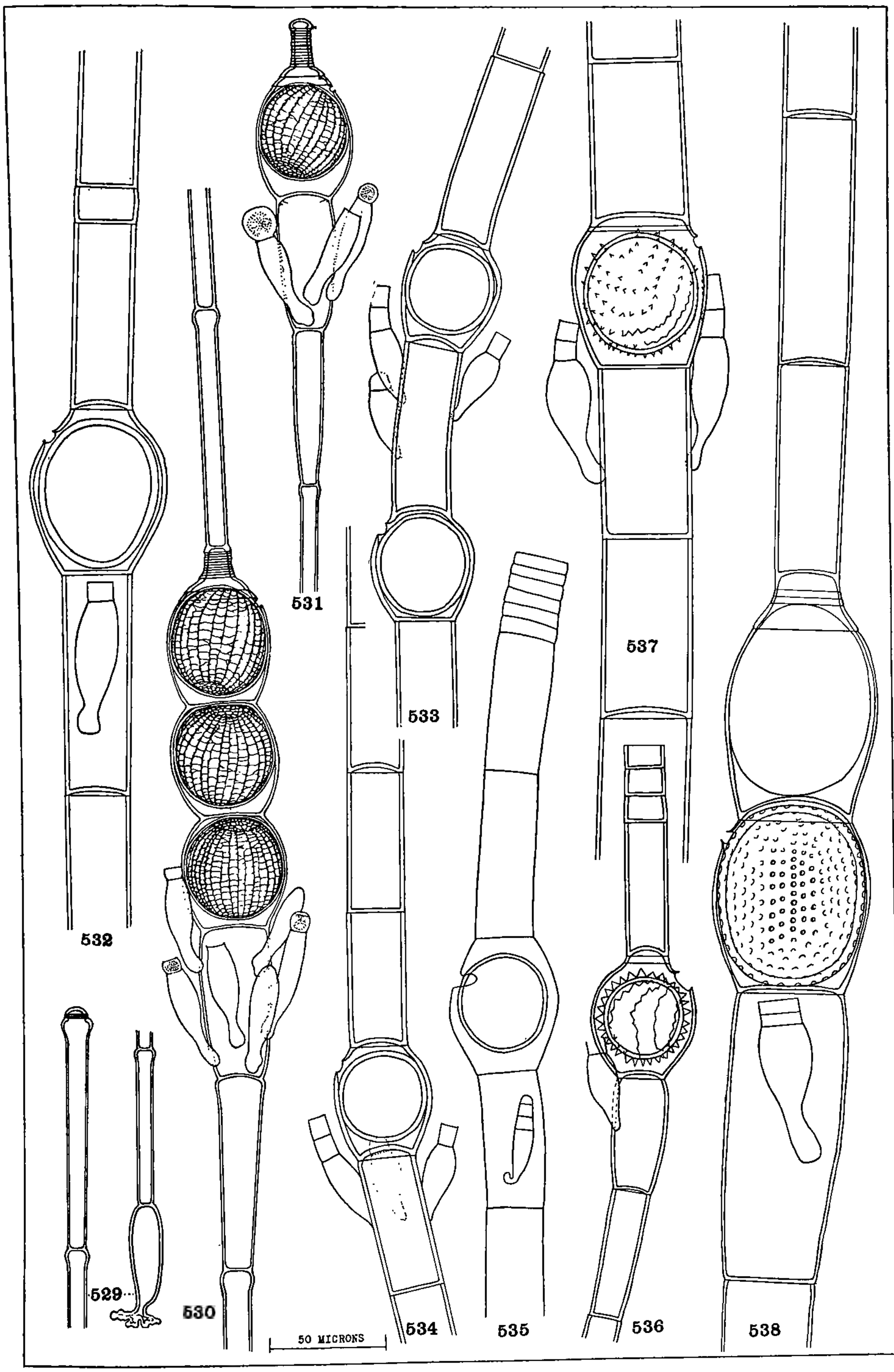


OEDOGONIUM

Plate 34

Figs. 529–531. *Oedogonium Taylorii* Jao.
Fig. 532. *Oedogonium crassiusculum* Wittr.
Fig. 533. *Oedogonium crassiusculum* var. *Arechavaletae* (Wittr.) Hirn.
Fig. 534. *Oedogonium crassiusculum* var. *cataractum* (Wolle) Tiff.
Fig. 535. *Oedogonium victoriense* G. West.
Fig. 536. *Oedogonium stellatum* Wittr.
Fig. 537. *Oedogonium Donnellii* Wolle.
Fig. 538. *Oedogonium concatenatum* (Hassall) Wittr.

(Figs. 529–531 after Jao; 535 redrawn from West; 536, 537 from Hirn.)

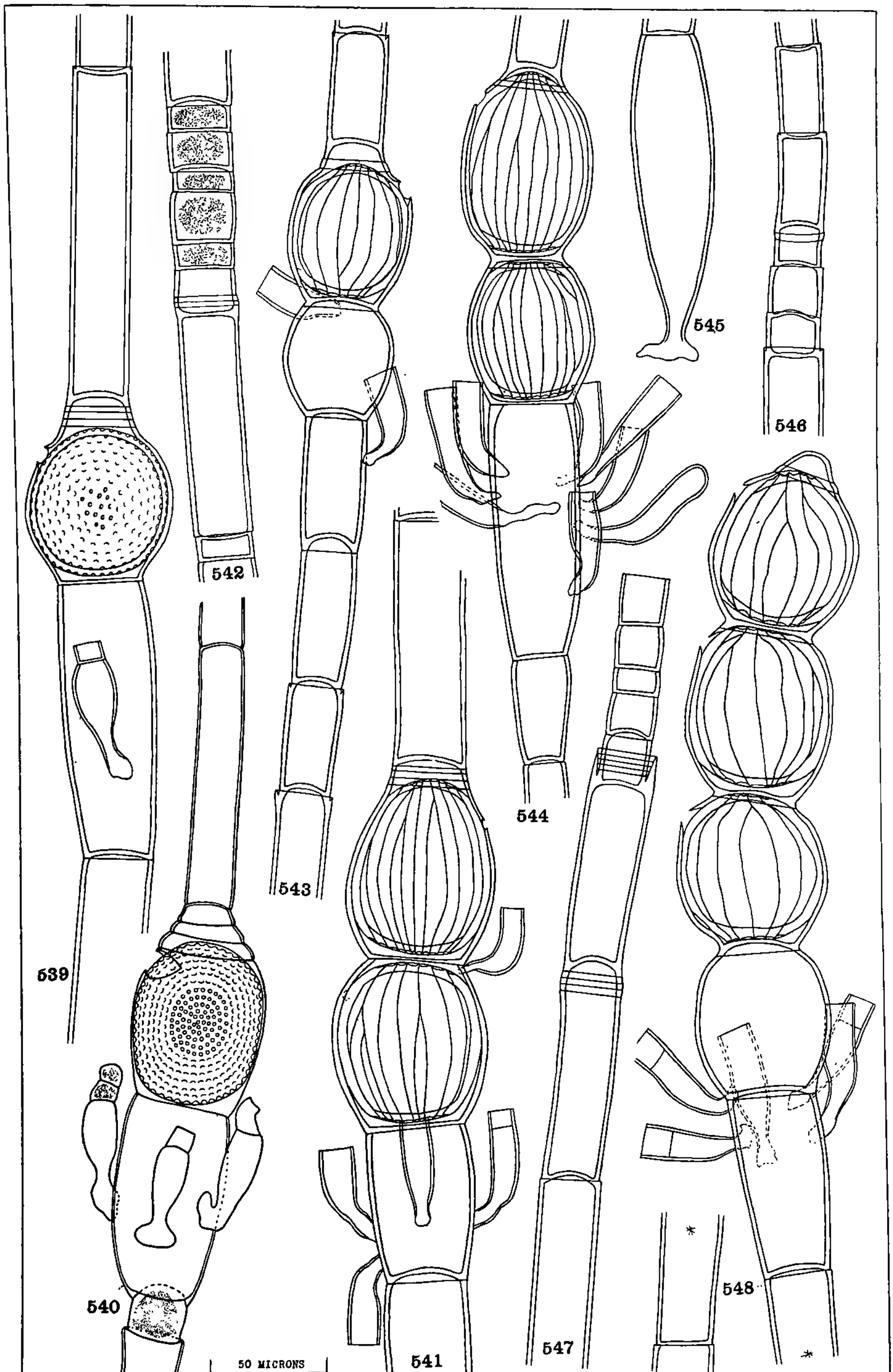


OEDOGONIUM

Plate 35

Fig. 539. *Oedogonium concatenatum* var. *Hutchinsiae* (Wittr.) Tiff.
Fig. 540. *Oedogonium concatenatum* var. *regulare* Taft.
Figs. 541, 542. *Oedogonium cyathigerum* Wittr.
Fig. 543. *Oedogonium cyathigerum* var. *ellipticum* Magnus & Wille.
Figs. 544–546. *Oedogonium cyathigerum* f. *ornatum* (Wittr.) Hirn.
Figs. 547, 548. *Oedogonium perfectum* (Hirn) Tiff.

(Figs. 540 after Taft; 543–548 redrawn from Hirn.)

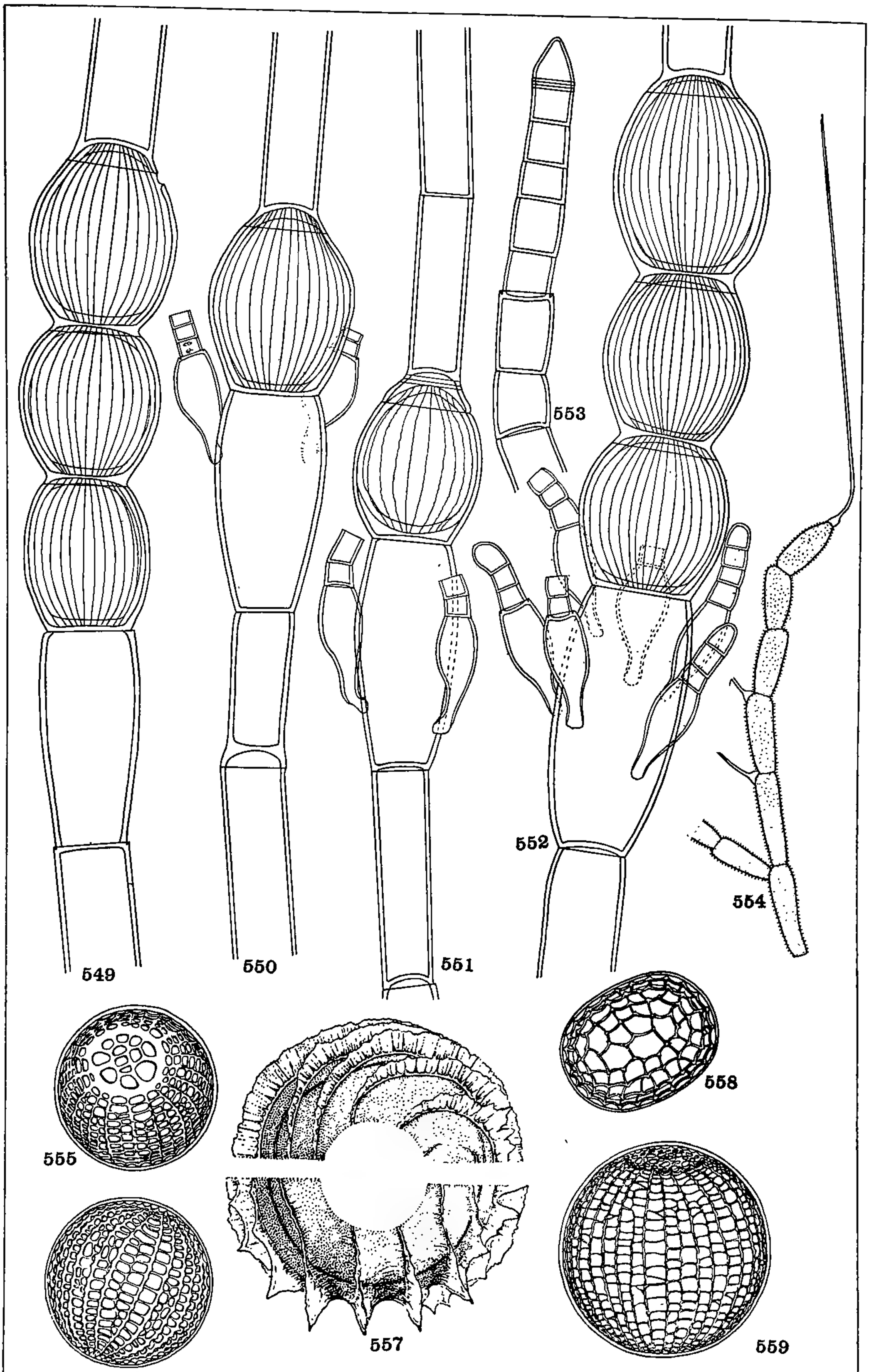


OEDOGONIUM

Plate 36

Figs. 549, 550. *Oedogonium Wolleanum* Wittr.
Fig. 551. *Oedogonium Wolleanum* var. *concinnum* Hirn.
Fig. 552, 553. *Oedogonium striatum* Tiff.
Fig. 554. *Bulbochaete spinosa* Wailes.
Figs. 555, 556. Two views of oospore of *Oe. reticulocostatum* Jao.
Fig. 557. Two views of oospore of *Oe. spiripennatum* Jao.
Fig. 558. Oospore of *Oe. areoliferum* (Jao) Tiff.
Fig. 559. Oospore of *Oe. Taylorii* Jao.

(Figs. 549–553 redrawn from Hirn; 554 from Wailes; 555–559 after Jao, on larger scale.)



OEDOGONIUM, BULBOCHAETE

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51–200.	1862.	*251–300*.	1866.	*401–430*.	1879.

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51–100.	Mr 1895.	*901–950.*	S 1902.	*1801–1850.*	F 1912.
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301–350.	Au 1897.	*1201–1250.*	Ja 1905.	*2051–2100.*	Mr 1916.
351–400.	N 1897.	*1251–1300.*	N 1905.	*2101–2150.*	Au 1916.
401–450.	My 1898.	*1301–1350.*	D 1906.	*2151–2250.*	Je 1917.
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801–850.	Jl 1901.	*1701–1750.*	My 1911.		

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51–150.	1826.	*751–850.*	1836.	*1451–1550.*	1846.
151–250.	1827.	*851–900.*	1837.	*1551–1650.*	1847.
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351–450.	1829.	*951–1050.*	1839.	*1751–1950.*	1849.
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